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Ms. Jennifer Sutter
Voluntary Cleanup and Portland Harbor Section
Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, OR 97232

Subject: EVRAZ Oregon Steel 2015 Beach and Bank Groundwater Monitoring Report

Dear Ms. Sutter:

In January 2015, EVRAZ Oregon Steel (EOS) sampled groundwater in select beach and bank monitoring wells at its Rivergate facility in Portland, Oregon. Sampling was conducted per an Oregon Department of Environmental Quality (DEQ) letter, dated March 22, 2013, requiring resampling of six wells that were likely impacted by a leak in the Willamette River water make-up line (river water line) during the September 2012 sampling event.

September 2012 groundwater concentrations in selected wells were affected by the river water line leak. With the exception of MW-13, water level and field parameter measurements (pH, conductivity, and temperature) since that time show that groundwater has essentially stabilized to pre-leak conditions. In MW-13, water levels and field parameter measurements have been generally stable over the past year. As compared to pre-leak conditions, seasonal water levels are approximately 4 ft higher, pH is approximately 3 units higher, and conductivity is approximately half of the pre-leak values. Temperature is similar to pre-leak conditions. Based on this stability over the past year and the pending well abandonment for the Riverbank source control measure, the DEQ-required sampling was completed in January 2015.

January 2015 groundwater concentrations were generally similar to or slightly less than those from pre-2012 sampling events. The exceptions were in monitoring well MW-17, where nickel was an order of magnitude higher than the pre-2012 sampling results, and in monitoring well MW-13, where manganese was 2 orders of magnitude lower than the

pre-2012 sampling results. This letter presents results of the January 2015 sampling and supports DEQ's groundwater source control decision recommendation of "no further action" (NFA) (DEQ 2013).

BACKGROUND

In 2005, EOS conducted a groundwater source control evaluation (SCE) to assess metals concentrations in groundwater at its Rivergate facility and evaluate the potential for these concentrations to reach Willamette River receptors at unacceptable levels. Bank wells were used to assess groundwater quality in a shallow, water-bearing zone on the upland portion of the riverbank, at the downgradient edge of the steel mill. Beach wells, located farther downgradient on the upper beach near the river's edge, were used to assess the potential for complete transport pathways from the upland portion of the shallow aquifer to the Willamette River (RETEC 2006a) and provide transition zone water (TZW)-equivalent data.

The 2005 SCE identified five metals at concentrations exceeding selected joint source control strategy (JSCS) screening level values (SLVs) in beach wells: arsenic, cadmium, lead, manganese, and nickel (RETEC 2006b). Differences between the lowest JSCS SLVs and beach groundwater for cadmium, lead, and nickel were slight, while arsenic and manganese concentrations were higher in comparison to SLVs. Metals concentrations in beach groundwater are consistent with TZW concentrations observed at other sites that have been evaluated as part of the U.S. Environmental Protection Agency's (EPA's) Portland Harbor groundwater pathway assessment program (RETEC 2006a).

Selected site monitoring wells have been sampled in 2002, 2005, 2008, 2009 and 2012. The 2012 sampling included all bank and beach monitoring wells and one background well to confirm consistent concentrations with previous results. Results from the September 2012 beach and bank groundwater monitoring indicated that metals concentrations were largely stable or declining slightly, compared to concentrations from previous monitoring events (Integral 2013). However, in the vicinity of monitoring wells MW-10 and MW-13 metals concentrations were significantly lower and groundwater elevations were unusually high due to a leak in the river water line. The leak of river water from the river water line was identified during the September 2012 sampling event and repaired when access was feasible in March 2013.

To better understand groundwater concentrations in the MW-10/MW-13 area without the influence of the leak, DEQ required an additional round of sampling from three bank wells and three beach wells. The sampling was to be completed after the river water line was repaired and groundwater stabilized to pre-leak conditions. In e-mail communications

with the DEQ in September 2013 (Integral and DEQ 2013), DEQ-required groundwater sampling was planned for after the following parameters returned to levels considered representative of pre-leak conditions in MW-13:

- Stabilized groundwater pH below 7
- Stabilized groundwater conductivity above 500 $\mu\text{mhos/cm}$
- Stabilized groundwater temperature similar ($\pm 20\%$) to events prior to September 2012
- Groundwater elevation in MW-13 down to within 1.5 ft of pre-leak measurements.

Groundwater field parameters were monitored periodically from well MW-13, and water levels were generally measured quarterly from wells MW-9, MW-10, MW-13, MW-17, MW-18, and MW-23 beginning in July 2013¹. Results of this monitoring are provided in Attachment A. With the exception of MW-13, groundwater elevations of wells in the vicinity of the river water line leak had returned to pre-leak elevations by September 2013.

On October 30, 2014, the pH of groundwater from MW-13 was 9.9, conductivity was 208 $\mu\text{mhos/cm}$, temperature was within 23%, and the groundwater elevation was approximately 4 ft higher than pre-leak conditions. These measurements are generally consistent with the October 2013 measurements, suggesting stable conditions but somewhat different from conditions prior to the leak. DEQ and EOS agreed to complete the DEQ-required sampling in January 2015 since the leak was repaired 22 months prior, conditions had stabilized, and wells will be decommissioned in summer 2015 as part of the Riverbank source control measure. Results from the required post-stabilization sampling, completed in January 2015, are the subject of this letter report.

METHODS

Field Procedures

Groundwater was sampled on January 19 and 20, 2015. The work was completed in accordance with the site-specific field sampling plan (Appendix A to the remedial investigation work plan; Exponent 2002) and the quality assurance project plan (QAPP)

¹ Water levels from wells MW-17, MW-18, and MW-23 were not measured during the first quarter of 2014.

(RETEC 2005), with minor revisions detailed below. The monitoring program included six wells:

- Bank wells MW-9, MW-10, and MW-13
- Beach wells MW-17, MW-18, and MW-23.

Monitoring well locations are shown on Figures 1 through 5.

Prior to groundwater sampling, depth to groundwater was measured in all wells with an electronic water level probe. Wells were purged, and groundwater samples were collected using low-flow sampling techniques. All wells except MW-9 and MW-13 were sampled using a peristaltic pump; wells MW-9 and MW-13 were sampled using a bladder pump, due to the greater depth to water in comparison to the other wells.

For wells sampled using the peristaltic pump, care was taken to adjust the flow rate to maintain well drawdown at less than 0.3 ft. Disposable tubing was used and replaced with clean tubing between sampling locations. For MW-9 and MW-13, the decontaminated bladder pump was operated at a flow rate of 0.15 L per minute, to maintain well drawdown at less than 0.3 ft.

Field parameters (pH, conductivity, temperature, redox potential, dissolved oxygen, and turbidity) were monitored every 5 minutes during groundwater purging, prior to sampling each well. Parameters were considered stable when each parameter was within 10% for three consecutive readings, except for pH, which was considered stable when readings were within ± 0.1 unit for three readings. Completed groundwater field forms are provided in Attachment B. Water was purged from each well until field parameter stability was attained. Therefore, total water volume purged from each well varied.

Samples were collected for select total and dissolved metals, alkalinity, sulfate, total suspended solids, hardness, and dissolved organic carbon (DOC). Dissolved metals and DOC sample bottles were filled by field-filtering groundwater through a 0.45- μ m filter. Samples were immediately sealed in Ziploc® bags and placed in a cooler with ice for transport under chain of custody to the ALS Environmental laboratory in Kelso, Washington, within 48 hours of collection. The following analytical methods were used:

- Total and dissolved arsenic, cadmium, lead, manganese, and nickel by EPA method 6020A
- Total calcium, magnesium, potassium, and sodium by EPA method 6010C
- Total suspended solids by standard method (SM) 2540D

- Chloride and sulfate by EPA method 300.0
- Alkalinity by SM 2320B
- Hardness as CaCO₃ by SM 2340B
- DOC by EPA method 415.1.

Completed chain-of-custody forms and laboratory reports are included in Attachment C.

Quality Assurance/Quality Control

Project quality assurance and quality control (QA/QC) procedures are discussed in Appendix B of the *Riverbank Source Control Evaluation Work Plan* (RETEC 2005). QA/QC samples were collected as part of the field effort. One field duplicate groundwater sample was collected during the sampling event to meet the standard of one duplicate per 20 field samples, as identified in the QAPP. The duplicate groundwater sample was collected by filling two consecutive sample bottles for each analyte. The field duplicate was not identified as a duplicate on the sample labels or chain-of-custody form but was identified as such in the field notebook and the sample logs. The field duplicate was analyzed for the same parameters as the investigative samples.

Data Quality

The data validation report presents an evaluation of precision, accuracy, method compliance (laboratory procedures and data management), completeness of the data set, and a summary of validation qualifiers assigned during this review (Attachment D). Precision, accuracy, method compliance, and completeness of the data set have been determined to be acceptable based on the data reported. Groundwater data have been determined to be usable for the purpose of assessing the presence (or absence) and concentrations of the analytes in groundwater.

RESULTS

Sampling was completed in 2012 to demonstrate that groundwater concentrations were relatively stable in beach and bank wells. Results showed stable or decreasing concentrations with the exception of wells influenced by the river water line leak. The three beach wells and three bank wells with the highest potential for groundwater quality to be affected by the river water line leak were again sampled in January 2015 per DEQ request. As discussed in Attachment A, with the exception of MW-13, field parameters

indicated wells had stabilized to pre-leak conditions. Sampling was conducted to assess whether metals concentrations in the vicinity of the former leak are either stable or decreasing relative to previous results (2005 through 2009 and not including September 2012 when groundwater quality was affected by the leak).

Selected metals groundwater results are provided in Table 1 and are compared to 2005 through 2009 and to 2012 results in Tables 2 and 3, respectively. Groundwater quality data dating back to 2002 are provided on Figures 1 through 8. Geochemical parameters are included in Table 4. Laboratory analytical reports are included in Attachment C. Groundwater level information is provided in Table 5.

Groundwater Levels

The January 2015 groundwater elevations in all beach and bank wells in the vicinity of the river water line leak are within the range of elevations observed during monitoring events prior to 2012 (Table 5). Groundwater elevations in bank wells MW-10 and MW-13, the wells most significantly impacted by the river water line leak, have dropped more than 3 ft since September 2012. The January 2015 groundwater elevation at MW-13 is 3.2 to 5.7 ft higher than it was during pre-leak (2005–2008) winter measurements (December--February; Attachment A). The January 2015 groundwater elevation in MW-10 is within the range of previous winter measurements.

Groundwater Quality

The 2015 groundwater quality results are generally similar or slightly less than those from pre-2012 sampling events. The exceptions are monitoring well MW-17, where nickel was less than an order of magnitude higher than the pre-2012 sampling results, and monitoring well MW-13, where manganese was 2 orders of magnitude lower than the pre-2012 sampling results.

The nickel concentration in MW-17 is considered anomalous and is likely not be representative of long-term conditions. The concentration is less than an order of magnitude above historical concentrations and upgradient concentrations. Review of laboratory data and procedures did not identify a clear reason for the anomalous concentration in monitoring well MW-17. However, MW-17 is located immediately downgradient of MW-13, the well with the most significant river water line leak effects that has not fully recovered to pre-leak conditions. While field parameters in MW-17 are similar to pre-leak conditions, nickel concentrations are likely ephemeral and influenced by dissolution/desorption from phases that were stable during the leak. The lower manganese

concentration in MW-13 is also likely related to as-yet-incomplete equilibration to pre-leak conditions in this area. The January 2015 alkalinity, chloride, and calcium in MW-13 are also lower than the 2005 results.

January 2015 total and dissolved metals concentrations are very similar. Only lead and manganese concentrations in MW-13 show a variation, but it is less than an order of magnitude (Table 1).

GROUNDWATER QUALITY DISCUSSION

This section compares groundwater quality to various criteria including the June 5, 2015 EPA draft Preliminary Remedial Goals (PRGs) for the Portland Harbor Feasibility Study (EPA draft PRGs), PRG values revised to consider sample-specific hardness, and the JSCS SLVs (Table 3-1 in DEQ and USEPA 2005, revised 2007). A. Liverman of DEQ indicated in a June 23, 2015 meeting that EPA draft PRGs, when finalized, will supersede the JSCS SLVs. Both EPA draft PRGs and JSCS SLVs are included in this discussion for completeness. Additional perspective is provided by comparing beach well concentrations to TZW concentrations elsewhere in Portland Harbor and to Portland Harbor surface water concentrations (Integral et al 2011).

Groundwater from beach wells is considered equivalent to TZW and, therefore, screening against EPA draft PRGs, hardness adjusted PRGs, JSCS SLVs, and TZW or pore water in Portland Harbor is relevant. Bank wells are located upgradient of beach wells on the inland side of the berm, and groundwater concentrations vary between bank and beach wells due to attenuation, geochemical transformation associated with variations in redox potential, pH, alkalinity, and organic carbon and localized site conditions. Screening levels (EPA draft PRGs, hardness adjusted PRGs, and JSCS SLVs) are not directly applicable to bank wells as this groundwater is not near the point of discharge to the river and comparisons to these levels are presented for reference only. Beach wells, located between berm wells and the surface water, are more appropriately screened against these levels.

Screening criteria for cadmium, lead, and nickel are based on, and therefore compared to, dissolved concentrations. For arsenic and manganese, the SLVs do not specify whether they are for comparison to total or dissolved concentrations. Therefore, criteria are conservatively compared to total metals concentrations.

Arsenic

All 2015 arsenic concentrations in bank and beach wells exceed both the EPA draft PRG and the lower JSCS SLV (Figure 1). However, these criteria are set below background concentrations measured upgradient of the EOS facility and regionally (2 µg/L; DEQ 2002).

Both the EPA draft PRG and the JSCS SLV for arsenic include human consumption of water. The EPA draft PRG is based on human consumption of water and seafood, and the JSCS SLV is an EPA tap water² screening level. Screening levels based on consumption of drinking water are overly conservative and not relevant to site uses. Drinking water is not a beneficial use of the upland shallow water-bearing zone at EOS (Exponent 2004). Upon discharge of groundwater to surface water, the potential uses of the Willamette River could theoretically include drinking water. However, there is no current or expected future use of this portion of the Willamette River as a water supply, and conventional treatment of river water would be necessary prior to using it as drinking water.³

Ecological risk was not associated with arsenic in the Baseline Ecological Risk Assessment for Portland Harbor (Windward 2013).

While beach groundwater concentrations exceed screening values based on human consumption of seafood, they are consistent with levels for TZW in Portland Harbor and do not affect river water quality. Arsenic concentrations in beach wells are consistent with arsenic in Portland Harbor TZW (Figure 2 and Attachment E). While TZW studies were implemented at sites with contaminated groundwater, the sampling also included reference areas not in the groundwater plumes (Figure E-1).

The river water arsenic concentrations measured off the EOS facility are comparable to those measured upstream in Portland Harbor, indicating that background TZW concentrations are not adversely affecting the water column.

Given the background concentrations of arsenic, and similar river concentrations upstream and off EVRAZ, arsenic in EOS groundwater is not adversely affecting Portland Harbor.

² Note that arsenic concentrations in 2015 beach groundwater samples are below the Drinking Water Maximum Contaminant Level of 10 µg/L

³ “Public domestic water supply” and “private domestic water supply” are among the designated beneficial uses of the Lower Willamette River; however, both uses are specifically qualified with the condition, “with adequate pretreatment and natural quality that meets drinking water standards” (Oregon Administrative Rules [OAR] 340-041-0340, Table 340A).

Cadmium and Lead

Dissolved cadmium and lead concentrations in bank and beach wells are below the EPA draft PRGs and JSCS SLVs. Both the EPA draft PRG and the JSCS SLV are based on the National Recommended Water Quality Criteria (NRWQC) and calculated considering receiving water hardness (Figures 3 and 4). These criteria use a hardness value (25 mg/L) lower than that in Portland Harbor TZW (typically >100 mg/L), and therefore they are conservative.

Cadmium and lead concentrations measured in EOS groundwater are not adversely affecting receptors in Portland Harbor.

Manganese

Manganese concentrations in most bank and all beach wells exceed the EPA draft PRG and the JSCS SLV, which are both set at a National Secondary Drinking Water Standard related to aesthetics and water taste (Figure 5). The standard is not risk-based and thus does not indicate adverse effects to receptors. Secondary maximum contaminant levels are established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor. Because site groundwater and the Willamette River are not used for drinking water, this standard is not applicable to beach groundwater.

Beach groundwater can also be compared to hardness-adjusted ecological criteria for manganese in TZW using the approach and calculations documented by Windward (Windward 2014). The ecological toxicity of manganese is sensitive to hardness. As shown on Figure 6, all three beach well concentrations and one of the three bank wells plot below hardness-based criteria indicating that the manganese in groundwater does not pose unacceptable ecological risk.

Consistent with this consideration of hardness, geochemical testing has shown that manganese behavior is largely controlled by localized geochemistry. As discussed in the metals in groundwater SCE (RETEC 2006b), metals in TZW must be interpreted in the context of local geochemical conditions. Consistent with previous sampling events,⁴ manganese concentrations in the central and southern portions of the beach are similar or higher than in paired upgradient bank wells. This is particularly evident in localized areas where slag is prevalent in the upper beach (e.g., immediately north of the dock). This slag

⁴ Excluding the September 2012 river water line leak event

is being removed as part of the Riverbank source control measure, and beach groundwater concentrations are expected to decrease. Nevertheless, hardness correction indicates manganese is not reaching the river at concentrations which will adversely affect receptors.

The manganese EPA draft PRG and JSCS SLV are lower than concentrations in background well MW-22 and are within the range of results from the Portland Harbor TZW study (Figure 7 and Attachment E). The geochemical processes mediating the concentrations in Portland Harbor TZW were studied and modeled in the Portland Harbor Remedial Investigation. Manganese was found to be a ubiquitous metal in TZW and predominantly reflects the local geochemical conditions of the sediment TZW environment and is independent of migration of upland groundwater plumes. Manganese in TZW at concentrations above the screening levels is likely derived from reductive dissolution of sedimentary manganese oxides, and appears to be maintained at approximate equilibrium with rhodochrosite or other manganese-bearing carbonate mineral (e.g., calcite) (Integral et al. 2011).

Human health criteria for manganese are not risk-based and not applicable to beach groundwater. Manganese does not exceed ecological risk-based criteria using sample-specific hardness, and manganese is present as a background metal. Based on the lack of risk and ubiquitous manganese concentrations in TZW, mediated by local geochemistry and unrelated to groundwater plumes, the groundwater at EOS is not adversely affecting the river.

Nickel

EPA determined, through the baseline human health and ecological risk assessments for Portland Harbor, that nickel does not pose unacceptable risk. Therefore, an EPA draft PRG was not developed. Dissolved nickel concentrations in the three bank wells and two of the three beach wells are below the JSCS SLV (Figure 8). Previous sampling events indicate the concentration in beach well MW-17 is generally below the JSCS SLV, but exceeded the JSCS SLV during the January 2015 sampling event by a factor of approximately 6. This anomalous result is likely the result of an ephemeral condition related to the river water line leak and not related to long-term concentrations.

As nickel does not pose unacceptable risk in Portland Harbor and the detection in MW-17 is likely to be ephemeral, nickel in EOS beach wells is not adversely affecting Portland Harbor.

SUMMARY

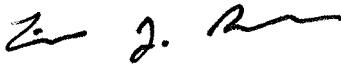
In January 2015, EOS sampled three bank and three beach monitoring wells in the vicinity of a 2012 river water line leak at its Rivergate facility. The leak was repaired in early 2013, and with the exception of MW-13, groundwater elevations and field parameters have stabilized to pre-leak conditions. Data from the January 2015 sampling event, in conjunction with September 2012 monitoring data for bank and beach wells not impacted by the leak, provide a complete data set for metals in groundwater. January 2015 sampling results show that groundwater conditions are stable or decreasing, as follows:

- Groundwater concentrations in beach and bank monitoring wells are generally consistent with or less than 2005–2009 results, prior to the leak. With the exception of nickel in MW-17, metals concentrations that exceed 2005 results are within a factor of 2. For MW-17, the nickel concentration exceeds 2005 results by a factor of 6.
- Monitoring wells MW-10, MW-13, and MW-17 showed a significant decrease in manganese and nickel concentrations during 2012 sampling (AECOM and Integral 2013); 2015 results indicate that the groundwater concentrations have predominantly returned to stable conditions since the leak was repaired:
 - MW-10: Concentrations are consistent with pre-leak concentrations.
 - MW-13: The manganese concentration remains 2 orders of magnitude below pre-leak concentrations; the nickel concentration has increased by an order of magnitude since September 2012 but remains slightly below pre-leak concentrations.
 - MW-17: Nickel concentrations are an order of magnitude higher than pre-leak concentrations, and are expected to be ephemeral and related to conditions not fully recovered in the vicinity of upgradient well MW-13.
- Beach groundwater quality is representative of TZW, and the only metals with exceedances of EPA draft PRGs are arsenic and manganese. However, these groundwater concentrations do not pose unacceptable risk in Portland Harbor.
 - While arsenic concentrations in beach wells exceed criteria based on human consumption of organisms, they are consistent with TZW concentrations observed at other sites that have been evaluated as part of EPA's Portland Harbor groundwater pathway assessment program and do not affect surface water quality off EOS. Surface water concentrations off EOS are comparable to concentrations upstream in Portland Harbor.

- Manganese concentrations, when corrected for hardness, are below risk-based concentrations. Concentrations in beach groundwater are consistent with TZW concentrations observed at other sites that have been evaluated as part of EPA's Portland Harbor groundwater pathway assessment program and are controlled by localized geochemical conditions.

January 2015 bank and beach groundwater monitoring results indicate that metals concentrations are generally stable or declining compared to 2005 to 2009 data. Cadmium, lead, and nickel are below EPA draft PRGs. With hardness corrections, manganese concentrations are below risk-based criteria. Arsenic is present as a background metal in surface water and TZW. Arsenic concentrations in surface water off EOS are comparable to upstream concentrations and are not being adversely affected by EOS beach groundwater. The January 2015 data support the NFA recommendation for groundwater at EOS, drafted by DEQ in April 2013.

Sincerely,



Linda Baker
Principal Hydrogeologist
Integral Consulting Inc.



Andrew Halmstad
Engineer
Integral Consulting Inc.

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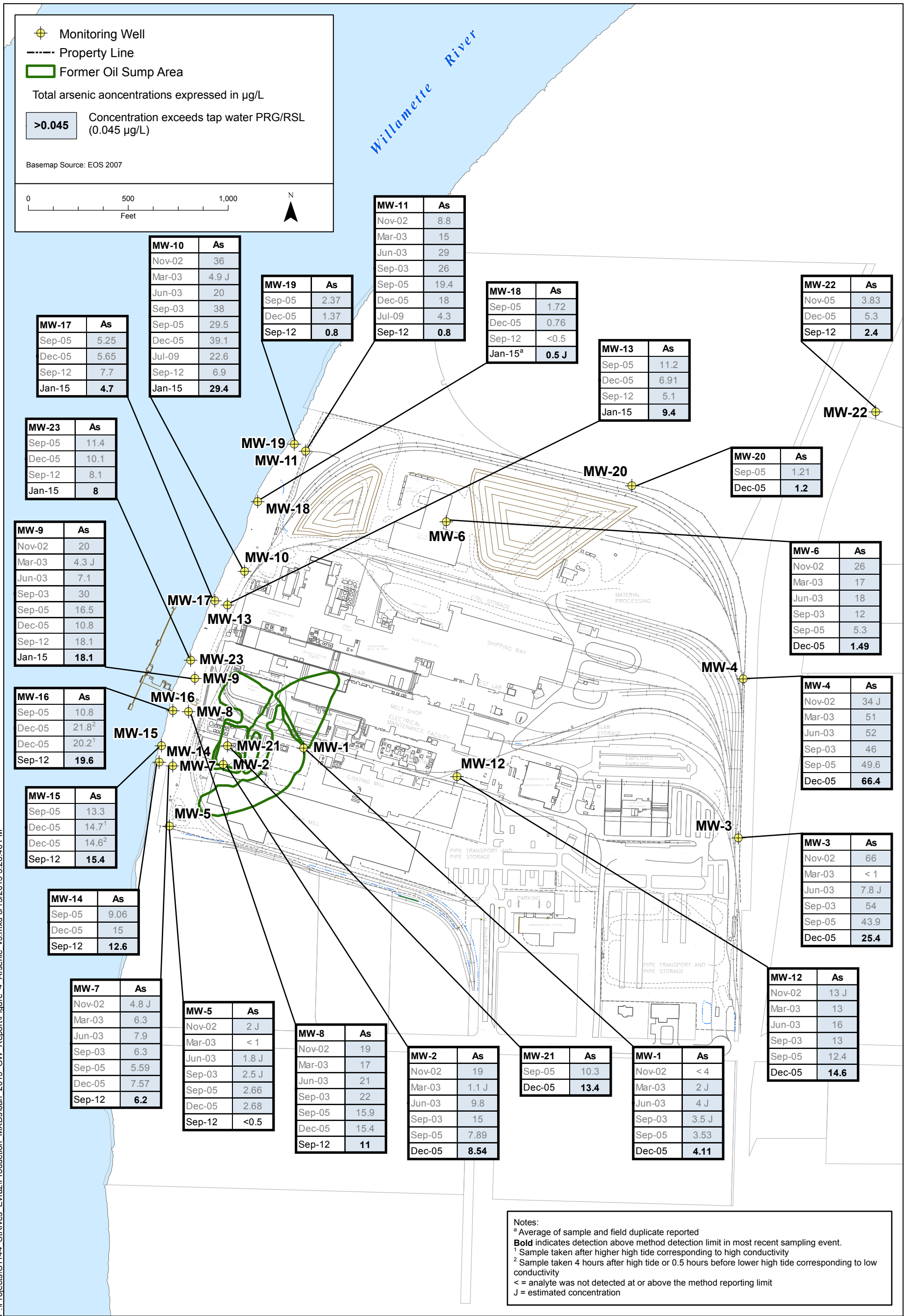
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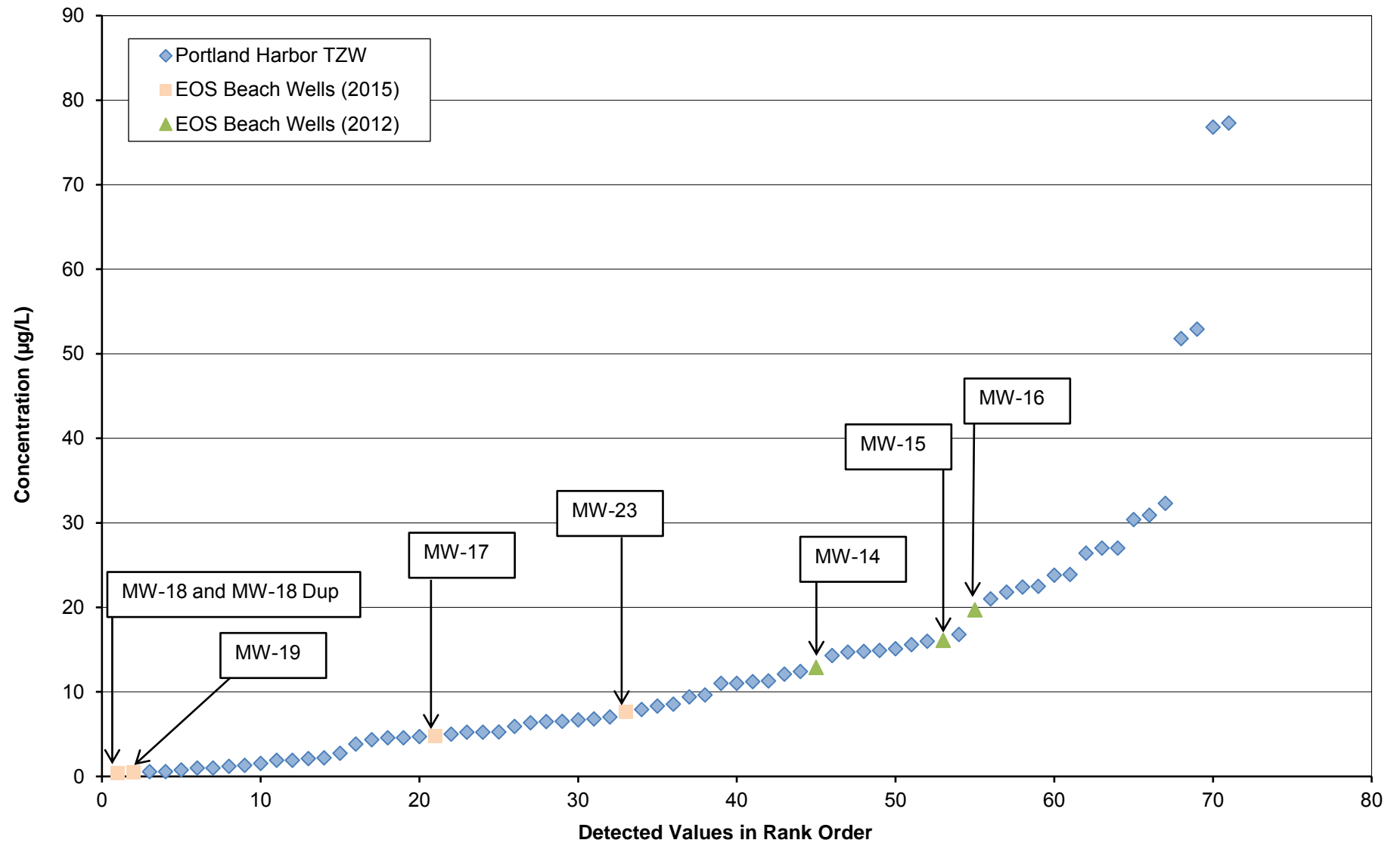
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FIGURES

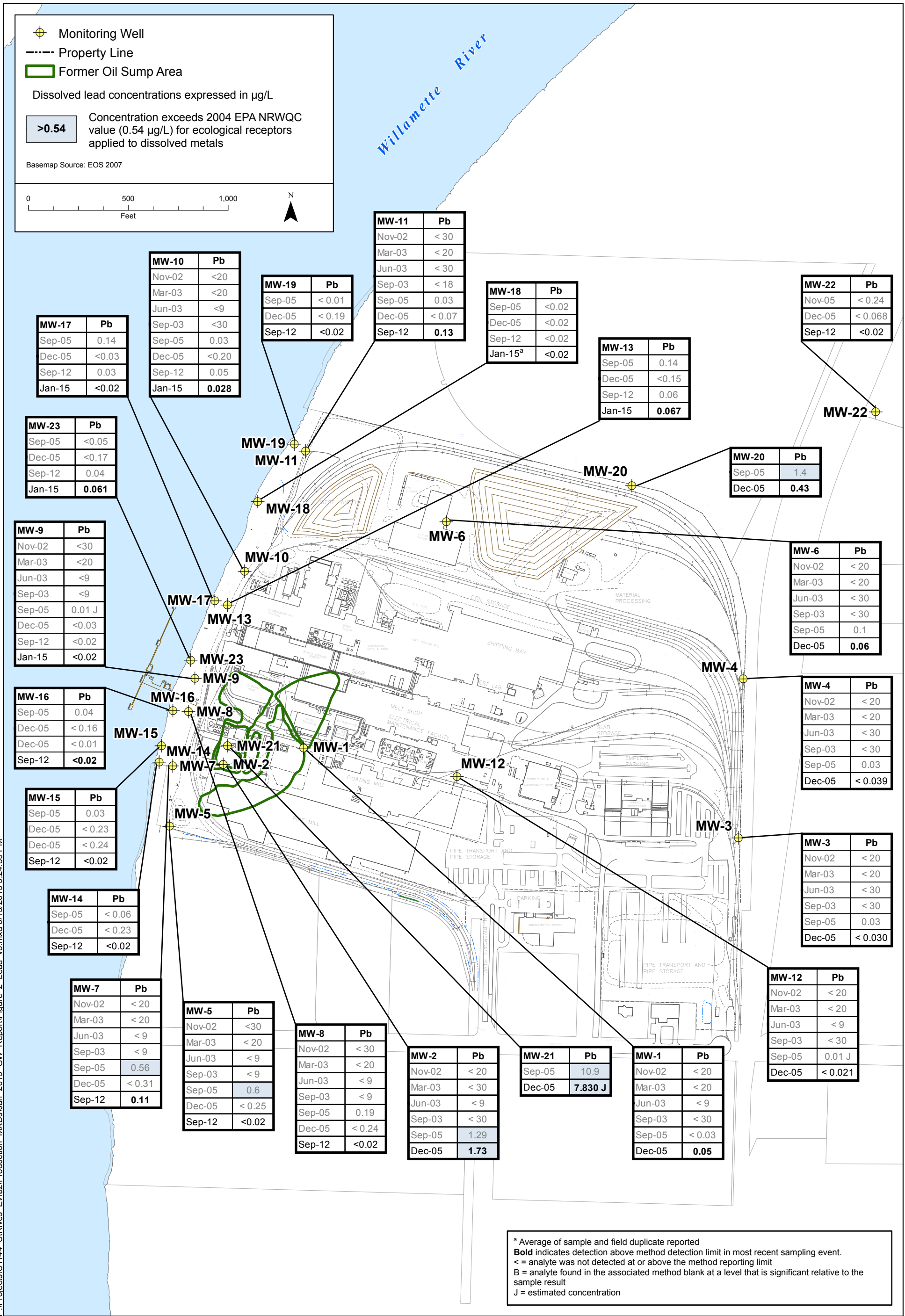
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Dissolved As in TZW



P:\Projects\IC1144 SIRives Evraz\Production MXDs\Jan 2015 GW Report\Figure 2 Lead v3.mxd 6/15/2015 3:24:59 PM



MW-3

Pb

Nov-02

< 20

Mar-03

< 20

Jun-03

< 30

Sep-03

< 30

Sep-05

0.03

Dec-05

< 0.030

MW-12

Pb

Nov-02

< 20

Mar-03

< 20

Jun-03

< 9

Sep-03

< 30

Sep-05

0.01 J

Dec-05

< 0.021

MW-1

Pb

Nov-02

< 20

Mar-03

< 20

Jun-03

< 9

Sep-03

< 30

Sep-05

< 0.03

Dec-05

0.05

MW-21

Pb

Sep-05

10.9

Dec-05

7.830 J

MW-2

Pb

Nov-02

< 20

Mar-03

< 30

Jun-03

< 9

Sep-03

< 30

Sep-05

1.29

Dec-05

1.73

MW-8

Pb

Nov-02

< 30

Mar-03

< 20

Jun-03

< 9

Sep-03

< 9

Sep-05

0.19

Dec-05

< 0.24

Sep-12

<0.02

MW-5

Pb

Nov-02

<30

Mar-03

< 20

Jun-03

< 9

Sep-03

< 9

Sep-05

0.6

Dec-05

< 0.25

Sep-12

<0.02

MW-7

Pb

Nov-02

< 20

Mar-03

< 20

Jun-03

< 9

Sep-03

< 9

Sep-05

0.56

Dec-05

< 0.31

Sep-12

0.11

MW-14

Pb

Sep-05

< 0.06

Dec-05

< 0.23

Sep-12

<0.02

MW-15

Pb

Sep-05

0.03

Dec-05

< 0.23

Dec-05

< 0.24

Sep-12

<0.02

MW-16

Pb

Sep-05

0.04

Dec-05

< 0.16

Dec-05

< 0.01

Sep-12

<0.02

MW-9

Pb

Nov-02

<30

Mar-03

<20

Jun-03

<9

Sep-03

<9

Sep-05

0.01 J

Dec-05

<0.03

Sep-12

<0.02

Jan-15

<0.02

MW-23

Pb

Sep-05

<0.05

Dec-05

<0.17

Sep-12

0.04

Jan-15

0.061

MW-17

Pb

Sep-05

0.14

Dec-05

<0.03

Sep-12

0.03

Jan-15

<0.02

MW-10

Pb

Nov-02

<20

Mar-03

<20

Jun-03

<9

Sep-03

<30

Sep-05

0.03

Dec-05

<0.20

Sep-12

0.05

Jan-15

0.028

MW-19

Pb

Sep-05

< 0.01

Dec-05

< 0.19

Sep-12

<0.02

MW-18

Pb

Sep-05

<0.02

Dec-05

<0.02

Sep-12

<0.02

MW-11

Pb

Sep-05

<0.02

Dec-05

<0.02

Sep-12

<0.02

MW-19

Pb

Sep-05

<0.02

Dec-05

<0.02

Sep-12

<0.02

MW-10

Pb

Sep-05

<0.02

Dec-05

<0.02

Sep-12

<0.02

MW-17

Pb

Sep-05

<0.02

Dec-05

<0.02

Sep-12

<0.02

MW-23

Pb

Sep-05

<0.02

Dec-05

<0.02

Sep-12

<0.02

MW-16

Pb

Sep-05

<0.02

Dec-05

<0.02

Sep-12

<0.02

MW-9

Pb

Sep-05

<0.02

Dec-05

<0.02

Sep-12

<0.02

MW-23

Pb

Sep-05

<0.02

Dec-05

<0.02

Sep-12

<0.02

MW-16

Pb

Sep-05

<0.02

Dec-05

<0.02

Sep-12

<0.02

MW-15

Pb

Sep-05

<0.02

Dec-05

<0.02

Sep-12

<0.02

MW-14

Pb

Sep-05

<0.02

Dec-05

<0.02

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MW-15

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MW-16

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MW-23

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MW-10

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MW-18

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MW-2

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MW-21

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MW-14

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MW-2

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Dec-05

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Sep-12

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MW-21

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Dec-05

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Sep-12

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MW-1

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Sep-12

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MW-12

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Sep-12

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MW-3

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MW-8

Pb

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Dec-05

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MW-5

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Dec-05

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Sep-12

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MW-7

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Dec-05

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MW-14

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MW-15

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Dec-05

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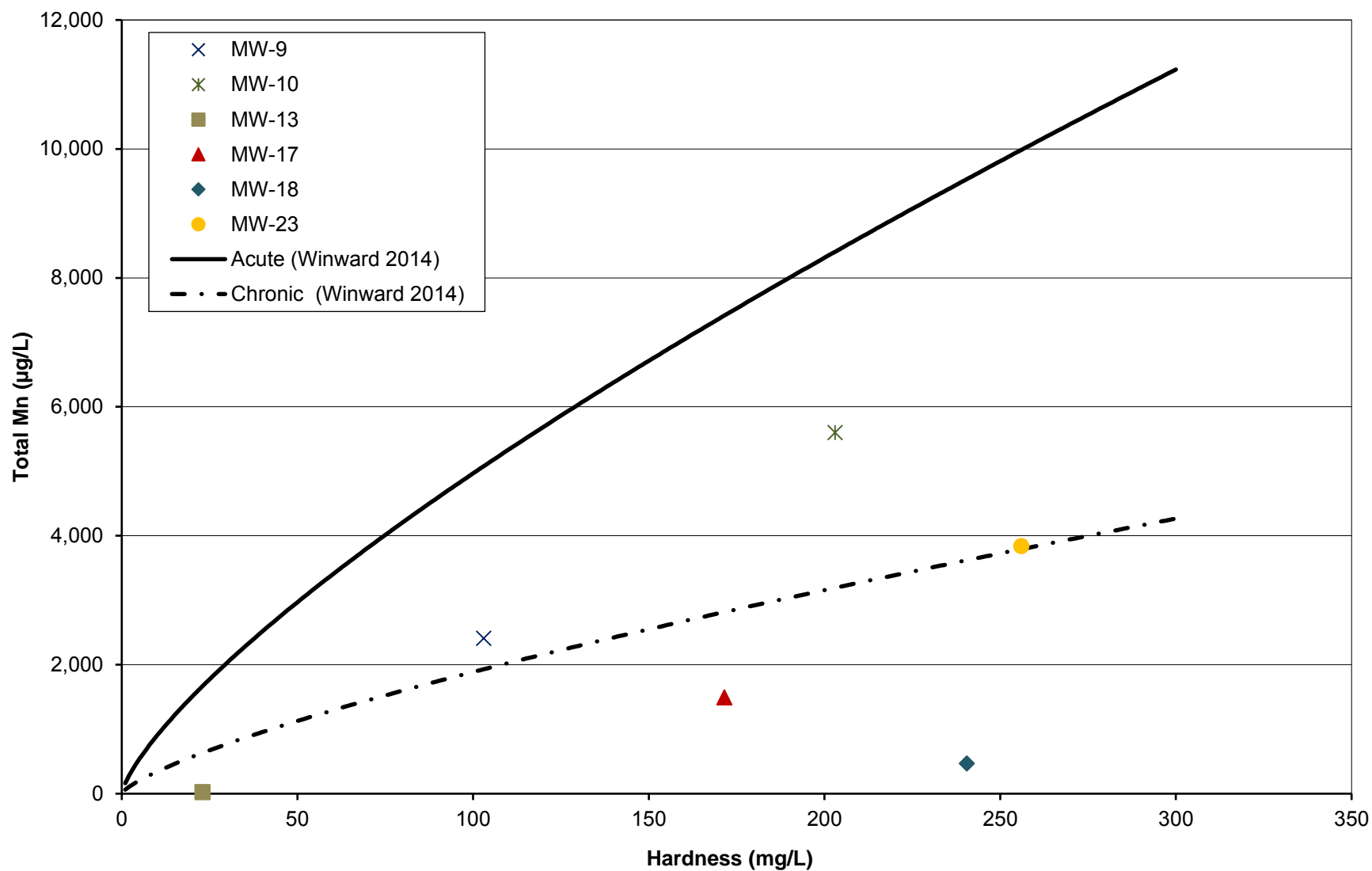
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Sep-12

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MW-18

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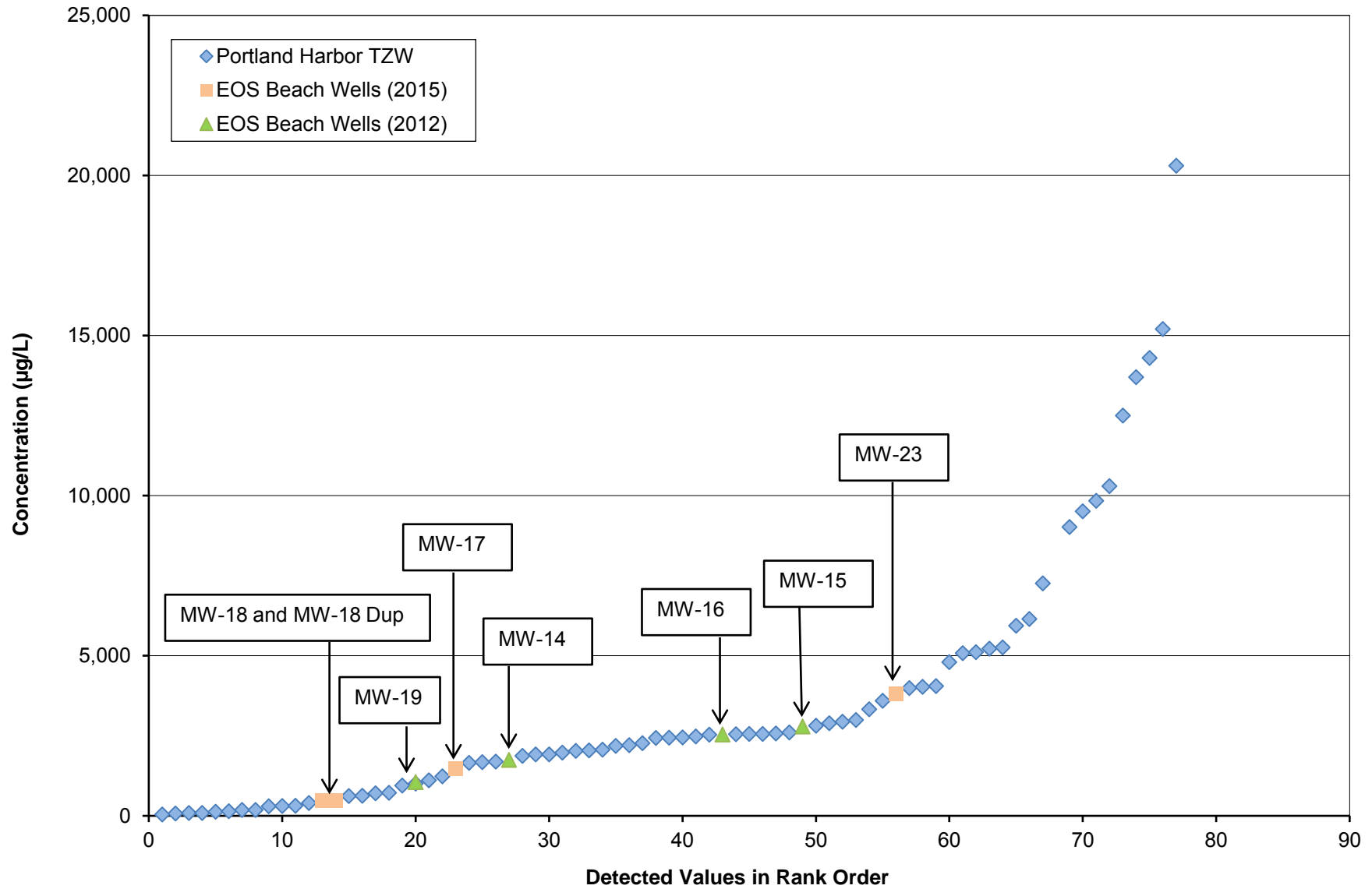
Sample date is January 2015 unless otherwise noted.

Acute criterion = $e^{(0.7424 [\ln(\text{hardness})] + 5.092)}$

Chronic criterion = $e^{(0.7424 [\ln(\text{hardness})] + 4.124)}$

Figure 6.
Hardness vs. Total Manganese Concentration

Dissolved Mn in TZW



TABLES

Table 1. January 2015 Groundwater Quality Results

				Arsenic (µg/L)	Cadmium ^b (µg/L)	Lead ^b (µg/L)	Manganese ^c (µg/L)	Nickel (µg/L)
DRAFT Portland Harbor Feasibility Study PRG				0.018 ^a	0.09	0.54	50	NV
Joint Source Control Strategy Screening Level Value				0.045 ^d	0.094 ^e	0.54	50	16 ^b
Well Number	Sample Identification	Sample Date	Sample Type					
Bank Wells								
MW-9	GW2015012007	1/20/2015	Dissolved	17.9	<0.02	<0.02	2,260	5.57
	GW2015012007	1/20/2015	Total	18.1	<0.02	<0.02	2,410	5.58
MW-10	GW2015011903	1/19/2015	Dissolved	31	<0.02	0.028	5,860	2.64
	GW2015011903	1/19/2015	Total	29.4	<0.02	<0.02	5,600	2.82
MW-13	GW2015011902	1/19/2015	Dissolved	9.1	0.031	0.067	3.62	4.31
	GW2015011902	1/19/2015	Total	9.4	0.031	0.319	23.1	4.6
Beach Wells								
MW-17	GW2015011901	1/19/2015	Dissolved	4.8	<0.02	<0.02	1,480	89.9
	GW2015011901	1/19/2015	Total	4.7	<0.02	0.026	1,480	94.3
MW-18	GW2015012005	1/20/2015	Dissolved	0.5 J	<0.02	<0.02	475	1.3
	GW2015012005	1/20/2015	Total	0.5 J	<0.02	<0.02	471	1.23
	GW2015012006 (dup)	1/20/2015	Dissolved	0.4 J	<0.02	<0.02	472	1.17
	GW2015012006 (dup)	1/20/2015	Total	0.5 J	<0.02	<0.02	470	1.24
MW-23	GW2015012004	1/20/2015	Dissolved	7.6	<0.02	0.061	3,810	14
	GW2015012004	1/20/2015	Total	8	<0.02	0.069	3,840	13.9

Notes:

Bold indicates detection above method detection limit.

yellow

beach well with concentrations exceeding screening level value used for initial upland source control evaluations of water (JSCS Table 3-1, 7/16/07); where criterion is applicable to the dissolved fractions, total metals concentrations are not identified as exceedances.

< = analyte not detected at or above the method reporting limit

EPA = U.S. Environmental Protection Agency

MCL = Drinking Water Maximum Contaminant Level

NRWQC = national recommended water quality criteria

PRG/RSL = preliminary remediation goal/regional screening level

^a Aquatic Water Quality Criteria (water + organism)

^b EPA's 2004 NRWQC for ecological receptors and adopted as a Threshold Reference Value in the Portland Harbor Baseline Ecological Risk Assessment and used as a JSCS SLV; expressed in terms of dissolved metals; criteria are hardness dependent and assume a hardness of 25 mg/L.

^c Clean Water Act, 33 USC 1313 and 1314, Section 304(a) List; national secondary drinking water standard; this criterion is not based on toxic effects, but rather is intended to minimize objectionable qualities such as laundry stains and objectionable tastes in beverages.

^d Tap water PRG/RSL

^e EPA's 2004 NRWQC ecological receptors, expressed in terms of dissolved metals

Table 2. 2005 to 2015 Groundwater Concentrations for Total Metals

Well Number	Sample Identification	Sample Date	Total Arsenic (µg/L)	Total Cadmium (µg/L)	Total Lead (µg/L)	Total Manganese (µg/L)	Total Nickel (µg/L)
Bank Wells							
MW-9	MW09-0905	9/20/2005	16.5	0.153 J	< 0.02	3,890	9.71
	MW09-1205	12/13/2005	10.8	0.17	0.02 J+	3,020	8.59 J
	MW09-0912	9/7/2012	18.1	0.05	0.05	2,740	12.0
	GW2015012007	1/20/2015	18.1	<0.02	<0.02	2,410	5.6
MW-10	MW10-0905	9/19/2005	29.5	0.102 J-	0.02	9,020	1.67
	MW10-1205	12/12/2005	39.1	0.167	0.05	9,670	3.17 J
	MW10-0708	7/9/2008	NA	0.01 B	<0.02	NA	2.6
	MW10-073009	7/30/2009	22.6	< 0.02 U	< 0.02 U	4,480	3.1
	MW10-0912	9/6/2012	6.9	<0.02	0.11	271	0.3
	MW10-0912 DUP-01	9/6/2012	7.2	<0.02	0.12	277	0.4
	GW2015011903	1/19/2015	29.4	<0.02	<0.02	5,600	2.82
MW-13	MW13-0905	9/21/2005	11.2	0.582 J	0.30	3,860	32.8
	MW13-1205	12/12/2005	6.91	0.240	0.07	4,210	19.1 J
	MW13-0912	9/6/2012	5.1	<0.02	0.08	3.38	0.4
	GW2015011902	1/19/2015	9.4	0.031	0.319	23.1	4.6
Beach Wells							
MW-17	MW17-0905	9/21/2005	5.25	< 0.208	< 0.07	1,400	24.2
	MW17-1205	12/14/2005	5.65	0.20	0.24	1,280	18.8 J
	MW17-0912	9/5/2012	7.7	0.09	0.12	188	1.0
	GW2015011901	1/19/2015	4.7	<0.02	0.026	1,480	94.3
MW-18	MW18-0905	9/21/2005	1.72	< 0.134	< 0.01	892	< 1.33
	MW18-1205	12/14/2005	0.76	0.09 J+	0.26 J	735	3.71 J
	DUP-2-1205	12/14/2005	0.76	0.05 J+	<0.01	767	3.47
	MW18-0912	9/5/2012	<0.5	0.1	0.09	637	0.7
	GW2015012005	1/20/2015	0.5 J	<0.02	<0.02	471	1.23
	GW2015012006 (dup)	1/20/2015	0.5 J	<0.02	<0.02	470	1.24
MW-23	MW23-0905	9/21/2005	11.4	< 0.254	< 0.08	6,860	15.5
	MW23-1205	12/13/2005	10.1	< 0.175	0.02 J+	8,360	15.5 J
	MW23-0912	9/6/2012	8.1	<0.02	0.08	8,690	18.9
	GW2015012004	1/20/2015	8	<0.02	0.069	3,840	13.9

Notes:

Bold indicates detection above method detection limit.

< = analyte not detected at or above the method reporting limit

B = analyte found in the associated method blank at a level that is significant relative to the sample result

J = estimated concentration

J- = estimated concentration, biased low

J+ = estimated concentration, biased high

NA = not analyzed

Table 3. 2005 to 2015 Groundwater Concentrations for Dissolved Metals

Well Number	Sample Identification	Sample Date	Dissolved Cadmium (µg/L)	Dissolved Lead (µg/L)	Dissolved Nickel (µg/L)
Bank Wells					
MW-9	MW09-0905	9/20/2005	< 0.178	0.01 J	10.7
	MW09-1205	12/13/2005	< 0.18	< 0.03	7.67
	MW09-0912	9/7/2012	<0.02	<0.02	12.5
	GW2015012007	1/20/2015	<0.02	<0.02	5.57
MW-10	MW10-0905	9/19/2005	< 0.084	0.03	< 1.92
	MW10-1205	12/12/2005	< 0.105	< 0.20	3.62
	MW10-0912	9/6/2012	<0.02	0.05	0.5
	MW10-0912 DUP-01	9/6/2012	<0.02	0.04	0.5
MW-13	GW2015011903	1/19/2015	<0.02	0.028	2.6
	MW13-0905	9/21/2005	0.479	0.14	33.0
	MW13-1205	12/12/2005	< 0.283	< 0.15	20.5
	MW13-0912	9/6/2012	<0.02	0.06	0.4
	GW2015011902	1/19/2015	0.031	0.067	4.31
Beach Wells					
MW-17	MW17-0905	9/21/2005	< 0.158	0.14	24.8
	MW17-1205	12/14/2005	0.20	< 0.03	18.4
	MW17-0912	9/5/2012	0.02	0.03	1.1
	GW2015011901	1/19/2015	<0.02	<0.02	89.9
MW-18	MW18-0905	9/21/2005	< 0.071	< 0.02	< 1.50
	MW18-1205	12/14/2005	0.11	< 0.02	3.17
	DUP-2-1205	12/14/2005	0.09 J+	0.03 J+	3.35
	MW18-0912	9/5/2012	<0.02	<0.02	0.8
	GW2015012005	1/20/2015	<0.02	<0.02	1.3
	GW2015012006 (dup)	1/20/2015	<0.02	<0.02	1.17
MW-23	MW23-0905	9/21/2005	< 0.161	< 0.05	16.1
	MW23-1205	12/13/2005	< 0.151	< 0.17	16.0
	MW23-0912	9/6/2012	<0.02	0.04	19.5
	GW2015012004	1/20/2015	<0.02	0.061	14

Notes:

Bold indicates detection above method detection limit.

< = analyte not detected at or above the method reporting limit

J = estimated concentration

J- = estimated concentration, biased low

J+ = estimated concentration, biased high

Table 4. Geochemical Parameters – January 2015 and December 2005

Well Number	MW-9		MW-10		MW-13	
Sample Identification	GW2015011907	MW-9-1205	GW2015011903	MW10-1205	GW2015011902	MW13-1205
Sample Date	1/20/2015	12/13/2005	1/19/2015	12/12/2005	1/19/2015	12/12/2005
Alkalinity as CaCO ₃	167	248	236	280	79	112
Calcium	25.8	45.9	50.1	63.6	8.59	33
Organic carbon ^a	6.3	11.4	9.2	10.2	3.75	5.1
Chloride	39.6	45.1	17.9	18.4	18	78
Hardness (calculated)	103.3	187.9	202.9	251.5	23.0	138.4
Magnesium	9.43	17.8	18.9	22.5	0.381	13.6
Potassium	2.36	3.24 J+	1.94	1.72	2.48	1.29
Sodium	53.1	63.6	19.7	21.4	39.5	43.5
Solids, total suspended (TSS)	19	--	82	--	< 5	--
Sulfate	0.14 J	1	< 0.2	< 0.2	6.54	3.3

Well Number	MW-17		MW-18			MW-23	
Sample Identification	GW2015011901	MW17-1205	GW2015011905	GW2015011906	MW18-1205	GW2015011904	MW23-1205
Sample Date	1/19/2015	12/14/2005	1/20/2015	1/20/2015	12/14/2005	1/20/2015	12/13/2005
Alkalinity as CaCO ₃	140	146	249	250	396	298	438
Calcium	31.6	36.9	41.7	41.7	64.1	52.5	85.4
Organic carbon ^a	4.68	3.9	4.29	4.35	4.6	9.8	15.1
Chloride	41.8	42.4	15.7	15.7	4.1	39.6	78.6
Hardness (calculated)	171.6	161.3	240.8	239.6	371.3	256.3	394.4
Magnesium	22.5	16.8	33.2	32.9	51.3	30.4	44
Potassium	1.32	2.13 J+	0.495	0.487	1.19 J+	2.43	2.85
Sodium	15.3	39.8	12.9	13	15.6	53.9	91.5
Solids, total suspended (TSS)	67	--	12	10	--	21	--
Sulfate	< 0.2	3.5	0.64	0.71	5.8	4.22	8.2

Notes:

All concentrations reported in mg/L.

^a January 2015 organic carbon is dissolved; December 2005 organic carbon is total.

J = estimated concentration

J+ = estimated concentration, biased high

Table 5. 2002 to 2015 Groundwater Elevation Monitoring Data (ft)

Bank Well Number	MW-9		MW-10		MW-13	
	Well Casing Elevation ^a					
	40.95		35.78		35.17	
	DTW	GWE	DTW	GWE	DTW	GWE
Measurement Date						
11/12/2002	33.96	6.99	23.55	12.23	—	—
3/18/2003	31.38	9.57	20.28	15.50	—	—
6/20/2003	31.67	9.28	21.68	14.10	—	—
9/16/2003	34.06	6.89	23.55	12.23	—	—
9/19/2005	33.87	7.08	24.26	11.52	25.99	9.18
12/12/2005	32.59	8.36	22.16	13.62	25.12	10.05
4/6/2007	31.14	9.81	20.97	14.81	24.26	10.91
9/17/2007	33.73	7.22	—	—	25.66	9.51
11/12/2007	33.84	7.11	22.42	13.36	25.82	9.35
12/9/2007	30.83	10.12	21.13	14.65	23.97	11.20
1/9/2008	31.04	9.91	20.73	15.05	—	—
2/5/2008	31.47	9.48	20.82	14.96	23.52	11.65
5/14/2008	28.99	11.96	20.11	15.67	20.21	14.96
7/8/2008	30.55	10.40	21.41	14.37	22.70	12.47
9/10/2008	33.65	7.30	23.42	12.36	25.56	9.61
12/12/2008	33.16	7.79	22.06	13.72	25.98	9.19
4/13/2009	32.59	8.36	21.11	14.67	22.11	13.06
5/4/2009	31.64	9.31	21.10	14.68	21.29	13.88
7/30/2009	33.28	7.67	22.60	13.18	22.26	12.91
9/5/2012 to 9/7/2012 - leak discovered/ repaired	32.41	8.54	18.37	17.41	16.03	19.14
7/1/2013	32.19	8.76	22.13	13.65	20.79	14.38
9/13/2013	32.95	8.00	22.65	13.13	21.82	13.35
10/13/2013	--	--	--	--	21.26	13.91
11/25/2013	33.14	7.81	22.46	13.32	21.39	13.78
1/19/2014	--	--	--	--	21.63	13.54
2/28/2014	31.12	9.83	21.62	14.16	14.62	20.55
3/11/2014	22.78	18.17	20.05	15.73	19.62	15.55
4/11/2014	30.80	10.15	21.23	14.55	20.32	14.85
5/28/2014	--	--	--	--	20.25	14.92
6/27/2014	--	--	--	--	20.96	14.21
7/30/2014	32.73	8.22	22.40	13.38	22.66	12.51
8/20/2014	--	--	--	--	23.45	11.72
9/3/2014	--	--	--	--	23.96	11.21
10/30/2014	33.35	7.60	22.45	13.33	21.65	13.52
1/19/2015	31.59	9.36	21.46	14.32	20.28	14.89

Beach Well Number	MW-17		MW-18		MW-23	
	Well Casing Elevation ^a					
	14.85		14.74		14.48	
	DTW	GWE	DTW	GWE	DTW	GWE
Measurement Date						
11/12/2002	—	—	—	—	—	—
3/18/2003	—	—	—	—	—	—
6/20/2003	—	—	—	—	—	—
9/16/2003	—	—	—	—	—	—
9/19/2005	8.45	6.40	9.72	5.02	8.14	6.34
12/12/2005	7.83	7.02	8.16	6.58	6.82	7.66
4/6/2007	6.02	8.83	5.83	8.91	5.35	9.13
9/17/2007	8.60	6.25	9.21	5.53	8.30	6.18
11/12/2007	8.09	6.76	8.10	6.64	7.72	6.76
12/9/2007	6.87	7.98	7.16	7.58	5.53	8.95
1/9/2008	6.02	8.83	5.89	8.85	5.31	9.17
2/5/2008	6.84	8.01	7.05	7.69	5.83	8.65
5/14/2008	—	—	—	—	—	—
7/8/2008	6.24	8.61	7.58	7.16	5.18	9.30
9/10/2008	8.07	6.78	8.98	5.76	7.79	6.69
12/12/2008	8.77	6.08	8.74	6.00	8.09	6.39
4/13/2009	6.06	8.79	6.34	8.40	6.35	8.13
5/4/2009	4.37	10.48	4.71	10.03	4.78	9.70
7/30/2009	7.81	7.04	7.78	6.96	7.98	6.50
9/5/2012 to 9/7/2012	4.85	10.00	8.15	6.59	6.25	8.23
7/1/2013	7.33	7.52	7.49	7.25	6.27	8.21
9/13/2013	7.93	6.92	8.09	6.65	6.95	7.53
4/11/2014	6.53	8.32	--	--	5.28	9.20
7/30/2014	7.87	6.98	7.00	7.74	6.92	7.56
10/30/2014	7.59	7.26	7.78	6.96	7.35	7.13
1/19/2015	5.66	9.19	5.46	9.28	5.25	9.23

Notes:
— = not measured
DTW = depth to water from top of well casing
GWE = groundwater elevation

^a National Geodetic Vertical Datum (NGVD) of 1929

ATTACHMENT A

2013-2014 FIELD PARAMETER MONITORING

ATTACHMENT A: 2013-2014 FIELD PARAMETER MONITORING

As reported in the EVRAZ Oregon Steel 2012 Beach and Riverbank Groundwater Monitoring Report (AECOM and Integral 2013), a leak in the Willamette River water intake line (the river water line) was discovered during the September 2012 monitoring well sampling event. Lower metals concentrations and anomalously high water levels were observed, indicating that groundwater in bank wells MW-10 and MW-13 and beach well MW-17 were impacted by the leak. September 2012 metals concentrations in most monitoring wells were similar to previous pre-leak monitoring concentrations; however, nickel and manganese concentrations in MW-10, MW-13, and MW-17 were one or more orders of magnitude lower than previous events (see Tables 2 and 3 of AECOM and Integral 2013). In addition to the lower nickel and manganese concentrations, MW-13 groundwater field parameters (e.g., pH, conductivity, temperature) were notably different in September 2012 compared to conditions recorded during the September 2005 monitoring event.

	September 2005	September 2012	Percentage Difference
Water Elevation (ft NGVD29)	9.18	19.14	
pH (standard units)	6.62	8.32	20%
Conductivity (µmhos/cm)	474	174	272%
Temperature (°C)	17.1	24.2	29%

As a result of the river water line leak, DEQ required sampling of six additional wells in its March 22, 2013 letter (DEQ 2013). Sampling was to be completed after repair to the river water line and following groundwater stabilization to pre-leak conditions. The river water line was repaired in March 2013 and water levels were monitored in select beach and berm wells periodically beginning in July 2013 (a minimum of quarterly). To further assess stabilization, groundwater field parameters were monitored quarterly in MW-13, the well closest to the leak beginning in September 2013. As stated in the attached email correspondence, DEQ agreed to the following approach for determining groundwater stabilization in MW-13, and subsequent sample collection from the six DEQ-requested wells:

- The stabilized groundwater pH is below 7
- The stabilized groundwater conductivity is above 500 µmhos/cm
- The stabilized groundwater temperature is similar (+/-20%) to events prior to September 2012.

Water level and field parameter monitoring results are provided on Table A-1. Water levels and field parameters were measured in October 2014, 19 months after repair of the river

water line leak. With the exception of MW-13, groundwater elevations in all monitored wells had recovered and were similar to pre-leak elevations. The groundwater elevation in MW-13 had decreased 5.6 feet since the leak was identified but remained approximately four feet higher than September 2005 elevation¹. October 2013 and October 2014 water elevations were very similar (less than a half foot difference in elevation). These measurements indicated that, from a physical perspective, groundwater had stabilized with an elevation approximately four feet above pre-leak conditions. Field parameters were also relatively stable over the last year of measurement. October 2014 field parameter measurements from MW-13 were as follows.

	September 2005	October 2014	Percent Difference
Level (above mean sea level; ft)	9.18	13.52	
pH (standard units)	6.62	9.9	33%
Conductivity (µmhos/cm)	474	208	228%
Temperature (°C)	17.1	21.5	20%

While the October 2014 field parameter measurements did not meet the resampling criteria EOS established with DEQ, EOS and DEQ agreed to complete the DEQ-required sampling in January 2015. Sampling was completed to assess groundwater conditions since the leak repair was completed approximately 22 months prior, water levels and field parameters were relatively stable over the past year, and monitoring wells will be decommissioned in early summer 2015 for the Riverbank Source Control Measure.

Field parameters measured during the January 2015 sampling event are also provided on Table A-1. MW-13 field parameters from January 2015 groundwater sampling event showed:

- Relatively stable pH at values above pre-leak conditions
- A slightly higher conductivity, but still approximately half pre-leak conditions
- Temperature similar to pre-leak conditions.

MW-13 groundwater elevations are relatively stability with post-leak conditions over the past year (given seasonal variation) and are approximately four feet above pre-leak water levels.

¹ The October 2014 groundwater elevation was within the range of previous measurements, being less than the elevation measured in May 2008 and May 2009.

Table A-1. Historical Sampling Results Versus 2013-2015 Groundwater Levels

Screened Interval (ft. bTOC) Well Casing Elevation ^a Sample Date				GW Level		Field Parameter						Selected Metals	
				Depth To Water (ft. bTOC)	Groundwater Elevation (ft. amsl)	pH	Conductivity (µmhos/cm)	Temperature (C)	ORP (mV)	Dissolved Oxygen (mg/L)	Turbidity (NTUs)	Total Manganese (µg/L)	Total Nickel (µg/L)
MW-10 (Berm Well)	15-30	35.78	June-03	21.68	14.10	--	--	--	--	--	--	--	--
			September-03	23.55	12.23	--	--	--	--	--	--	--	--
			September-05	24.26	11.52	6.89	678	16.8	-241.8	0.6	5.36	9020	1.67
			December-05	22.16	13.62	6.68	674	11.04	-122.3	0.89	14.5	9670	3.17
			September-12	18.37	17.41	7.51	138	23.79	-163.6	0.07	5.02	274	0.35
			diff: 9/2012 - 9/2005	-5.89	5.89	0.62	-540	6.99	78.2	-0.53	-0.34	-8746	-1.32
			% difference 9/12 to 9/05	--	--	9%	-132%	34%	-39%	-158%	-7%	-188%	-131%
			July-13	22.13	13.65	--	--	--	--	--	--	--	--
			September-13	22.65	13.13	--	--	--	--	--	--	--	--
			diff: 9/2013 - 9/2005	-1.61	1.61	--	--	--	--	--	--	--	--
			November-13	22.46	13.32	--	--	--	--	--	--	--	--
			February-14	21.62	14.16	--	--	--	--	--	--	--	--
			March-14	20.05	15.73	--	--	--	--	--	--	--	--
			April-14	21.23	14.55	--	--	--	--	--	--	--	--
			July-14	22.4	13.38	--	--	--	--	--	--	--	--
			October-14	22.45	13.33	--	--	--	--	--	--	--	--
			diff: 10/2014 - 9/2005	-1.81	1.81	--	--	--	--	--	--	--	--
			January-15	21.46	14.32	6.67	586	14.95	-132.97	0.32	0.29	5600	2.82
MW-13 (Berm Well)	15-30	35.17	diff: 01/2015 - 12/2005	--	--	-0.01	-88	3.91	-10.67	-0.57	-14.21	--	--
			% diff 01/15 to 12/2005	--	--	0%	-14%	30%	8%	-94%	-192%	--	--
			September-05	25.99	9.18	6.62	474	17.14	-151.6	1.18	6.45	3860	32.8
			December-05	25.12	10.05	6.59	521	16.76	-21	1.49	0.85	4210	19.1
			September-12	16.03	19.14	8.32	147	24.2	-115.9	2.14	3.57	3.38	0.4
			diff: 9/2012 - 9/2005	-9.96	9.96	1.7	-327	7.06	35.7	0.96	-2.88	-3856.62	-32.4
			% difference 9/12 to 9/05	--	--	23%	-105%	34%	-27%	58%	-57%	-200%	-195%
			July-13	20.79	14.38	--	--	--	--	--	--	--	--
			September-13	21.82	13.35	9.99	179	20.74	-66.2	2.9	10.01	--	--
			diff: 9/2013 - 9/2005	-4.17	4.17	3.37	-295	3.6	85.4	1.72	3.56	--	--
			% diff 9/13 to 9/05	--	--	41%	-90%	19%	-78%	84%	43%	--	--
			October-13	21.26	13.91	--	--	--	--	--	--	--	--
			13-Nov-13	21.39	13.78	--	--	--	--	--	--	--	--
			25-Nov-13	21.24	13.93	9.7	196	19.5	--	--	5.15	--	--
			diff: 11/2013 - 9/2005	-4.75	4.75	3.08	-278	2.36	--	--	-1.3	--	--
			% diff 11/13 to 9/05	--	--	38%	-83%	13%	--	--	-22%	--	--
			29-Jan-14	21.63	13.54	--	--	--	--	--	--	--	--
			28-Feb-14	20.55	14.62	--	--	--	--	--	--	--	--
			11-Mar-14	19.62	15.55	9.3	216	17.5	--	--	5.69	--	--
			diff: 3/2014 - 9/2005	-6.37	6.37	2.68	-258	0.36	--	--	-0.76	--	--
			% diff 3/14 to 9/05	--	--	34%	-75%	2%	--	--	-13%	--	--
			11-Apr-14	20.32	14.85	--	--	--	--	--	--	--	--
			05-May-14	20.42	14.75	--	--	--	--	--	--	--	--
			28-May-14	20.25	14.92	--	--	--	--	--	--	--	--
			27-Jun-14	20.96	14.21	--	--	--	--	--	--	--	--
			30-Jul-14	22.66	12.51	9.4	194	20.3	--	--	--	--	--
			20-Aug-14	23.45	11.72	--	--	--	--	--	--	--	--
			03-Sep-14	23.96	11.21	--	--	--	--	--	--	--	--
			10-Oct-14	23.05	12.12	--	--	--	--	--	--	--	--
			30-Oct-14	21.65	13.52	9.9	208	21.5	--	--	3.72	--	--
			diff: 10/2014 - 9/2005	-2.94	2.94	3.28	-266	4.36	--	--	-2.73	--	--
			% diff 10/14 to 9/05	--	--	40%	-78%	23%	--	--	-54%	--	--
			January-15	20.28	14.89	9.61	235	17.78	-64.8	1.54	5.23	23.1	4.6
			diff: 01/2015 - 12/2005	--	--	3.02	-286	1.02	-43.8	0.05	4.38	--	--
			% diff 01/15 to 12/2005	--	--	37%	-76%	6%	102%	3%	144%	--	--
MW-17 (Beach Well)	3.5-13.5	14.85	September-05	8.45	6.40	6.6	668	18.52	-195.2	0.34	8.47	1400	24.2
			December-05	7.83	7.02	5.96	576	13.72	-104.2	0.92	11.4	1280	18.8
			September-12	4.85	10.00	7.11	152	21.08	-157.7	0.06	42	188	1
			diff: 9/2012 - 9/2005	-3.6	3.6	0.51	-516	2.56	37.5	-0.28	33.53	-1212	-23.2
			% difference 9/12 to 9/05	--	--	7%	-126%	13%	-21%	-140%	133%	-153%	-184%
			July-13	7.33	7.52	--	--	--	--	--	--	--	--
			September-13	7.93	6.92	--	--	--	--	--	--	--	--
			diff: 9/2013 - 9/2005	-0.52	0.52	--	--	--	--	--	--	--	--
			April-14	6.53	8.32	--	--	--	--	--	--	--	--
			July-14	7.87	6.98	--	--	--	--	--	--	--	--
			October-14	7.59	7.26	--	--	--	--	--	--	--	--
			diff: 10/2014 - 9/2005	-0.86	0.86	--	--	--	--	--	--	--	--
			% diff 10/14 to 9/05	--	--	--	--	--	--	--	--	--	--
			January-15	5.66	9.19	6.38	532	14.89	-81.97	0.75	12.2	1480	94.3
			diff: 01/2015 - 12/2005	--	--	0.42	-44	1.17	22.23	-0.17	0.8	--	--
			% diff 01/15 to 12/2005	--	--	7%	-8%	8%	-24%	-20%	7%	--	--

Table A-1. Historical Sampling Results Versus 2013-2015 Groundwater Levels

Screened Interval Location ID (ft. bTOC) Well Casing Elevation ^a Sample Date				GW Level		Field Parameter						Selected Metals	
				Depth To Water (ft. bTOC)	Groundwater Elevation (ft. amsl)	pH	Conductivity (µmhos/cm)	Temperature (C)	ORP (mV)	Dissolved Oxygen (mg/L)	Turbidity (NTUs)	Total Manganese (µg/L)	Total Nickel (µg/L)
MW-9 (Berm Well)	22-37	40.95	June-03	31.70	9.25	--	--	--	--	--	--	--	--
			September-03	34.06	6.89	--	--	--	--	--	--	--	--
			September-05	33.87	7.08	6.91	620	17.13	-208.4	0.8	7.01	3890	9.71
			December-05	32.59	8.36	6.7	774	10.92	-62.9	2.37	2.3	3020	8.59
			September-12	32.41	8.54	6.52	802	17.81	-173.6	0.05	6.82	2740	12
			diff: 9/2012 - 9/2005	-1.46	1.46	-0.39	182	0.68	34.8	-0.75	-0.19	-1150	2.29
			% difference 9/12 to 9/05	--	--	-6%	26%	4%	-18%	-176%	-3%	-35%	21%
			July-13	32.19	8.76	--	--	--	--	--	--	--	--
			September-13	32.95	8.00	--	--	--	--	--	--	--	--
			diff: 9/2013 - 9/2005	-0.92	0.92	--	--	--	--	--	--	--	--
			November-13	33.14	7.81	--	--	--	--	--	--	--	--
			February-14	31.12	9.83	--	--	--	--	--	--	--	--
			March-14	27.78	13.17	--	--	--	--	--	--	--	--
			April-14	30.8	10.15	--	--	--	--	--	--	--	--
			July-14	32.73	8.22	--	--	--	--	--	--	--	--
			October-14	33.35	7.60	--	--	--	--	--	--	--	--
			diff: 10/2014 - 9/2005	-0.52	0.52	--	--	--	--	--	--	--	--
			January-15	31.59	9.36	6.51	528	15.62	-94.5	0.32	0.55	2410	5.58
			diff: 01/2015 - 12/2005	--	--	-0.19	-246	4.70	-31.60	-2.05	-1.75	--	--
			% diff 01/15 to 12/2005	--	--	-3%	-38%	35%	40%	-152%	-123%	--	--
MW-18 (Beach Well)	4-14	14.74	September-05	9.72	5.02	6.62	698	14.74	-79.3	0.37	2.16	892	<1.33
			December-05	8.16	6.58	5.82	670	11.4	-16.9	0.55	34.7	751	3.59
			September-12	8.15	6.59	6.36	575	16.92	-86.8	0.1	10.09	637	0.7
			diff: 9/2012 - 9/2005	-1.57	1.57	-0.26	-123	2.18	-7.5	-0.27	7.93	-255	--
			% difference 9/12 to 9/05			-4%	-19%	14%	9%	-115%	129%	-33%	--
			July-13	7.49	7.25	--	--	--	--	--	--	--	--
			September-13	8.09	6.65	--	--	--	--	--	--	--	--
			diff: 9/2013 - 9/2005	-1.86	1.86	--	--	--	--	--	--	--	--
			July-14	7.86	6.88	--	--	--	--	--	--	--	--
			October-14	7.78	6.96	--	--	--	--	--	--	--	--
			diff: 10/2014 - 9/2005	-1.94	1.94	--	--	--	--	--	--	--	--
			January-15	5.46	9.28	6.45	478	12.36	-57.97	0.37	0.21	471	1.23
			diff: 01/2015 - 12/2005	--	--	0.63	-192	0.96	-41.07	-0.18	-34.49	--	--
			% diff 01/15 to 12/2005	--	--	10%	-33%	8%	110%	-39%	-198%	--	--
MW-23 (Beach Well)	3.5-13.5	14.48	September-05	8.14	6.34	6.15	930	17.94	-190.8	1.05	2.93	6860	15.5
			December-05	6.82	7.66	6.67	838	13.19	-216.8	0.2	0.25	8360	155
			September-12	6.25	8.23	6.87	892	22.14	-178.7	0.04	3.39	8690	18.9
			diff: 9/2012 - 9/2005	-1.89	1.89	0.72	-38	4.2	12.1	-1.01	0.46	1830	3.4
			% difference 9/12 to 9/05	--	--	11%	-4%	21%	-7%	-185%	15%	24%	20%
			July-13	6.27	8.21	--	--	--	--	--	--	--	--
			September-13	6.95	7.53	--	--	--	--	--	--	--	--
			diff: 9/2013 - 9/2005	-1.19	1.19	--	--	--	--	--	--	--	--
			April-14	5.28	9.20	--	--	--	--	--	--	--	--
			July-14	6.92	7.56	--	--	--	--	--	--	--	--
			October-14	7.35	7.13	--	--	--	--	--	--	--	--
			diff: 10/2014 - 9/2005	-0.79	0.79	--	--	--	--	--	--	--	--
			January-15	5.25	9.23	6.72	541	11.54	-82.33	0.56	3.43	3840	13.9
			diff: 01/2015 - 12/2005	--	--	0.05	-297	-1.65	134.47	0.36	3.18	--	--
			% diff 01/15 to 12/2005	--	--	1%	-43%	-13%	-90%	95%	173%	--	--

Source: Integral and AECOM (2013). EVRAZ Oregon Steel 2012 Beach and Riverbank Groundwater Monitoring Report

Notes:

=wells noted in Feb 2013 Integral/AECOM Beach & Riverbank GW Monitoring Report

=wells added by DEQ in the March 22,2013 letter to investigate

=percent difference in field parameter measurements between monitoring events

September-05 or December-05 is the reference date for comparison ("historic" condition)

ft. amsl = feet above mean sea level

ft. bTOC = feet below top of casing

% diff = percent difference between dates shown

--=not measured

bold values represent the most recent measurements at each location

^a Vertical reference datum is National Geodetic Vertical Datum (NGVD) of 1929

ATTACHMENT B

FIELD FORMS



GROUNDWATER SAMPLE COLLECTION FORM

319 SW Washington St, Suite 1150
Portland, OR 97204
(503) 284-5545

Well ID: MW-17
Sample ID: GW2015011901
Date: 11/19/15

StRives - Evraz: Addtl GW
Project Name: Sampling Beach &
Riverbank

Project Number: C1144_0204

Field Staff: A. HALLSTADT + K. M. P. R.

Well Information

Monument Condition: ☒ Good ☐ Needs Repair
Well Cap Condition: ☐ Good ☐ Locked ☐ Replaced ☒ Needs Replacement
Elevation Mark: ☐ Yes ☐ Added ☒ other from N. side but present
Well Diameter: ☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Odor: ☐ Comments

Casing Volume

Total Well Depth: 17 ft ☐ Clean Bottom ☒ Muddy Bottom ☐ Not Measured
Depth to Water: 5.66 ft
Casing Volume: _____ ft (H2O) X _____ gpf = _____ gallons
3/4" = 0.02 gpf 1" = 0.04 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf

Purge Data

Pump Type: Peristaltic Purge Start Time: 10:50
Tubing Type: LOPE (new) Purge Stop Time: 12:20 Purge Rate (gpm): 0.1
Sample Intake Depth: 10 ft bTOC Total volume purged: 11.95L Sample Rate (gpm): _____

Field Parameters

Time	Water Level (ft bTOC)	Cumulative Vol. Purged (gallons)	pH (+/- 0.1 unit)	Temperature (°C) +/- 10%	Conductivity (mS/cm) +/- 10%	ORP (mV) +/- 10%	DO (mg/L) +/- 10%	Turbidity (NTU) +/- 10%	Comments
1105	5.90	2L	6.24	14.51	0.538	39.7	1.38	33.4	slightly turbid
1110	5.50	3L	6.33	14.70	0.544	4.1	0.99	33.3	"
1115	5.50	4L	6.34	14.95	0.546	-12.8	0.89	29.8	"
1120	5.50	4.5L	6.35	15.08	0.548	-28.2	0.80	27.1	"
1125	5.50	5.25L	6.35	14.94	0.546	-38.4	0.86	25.9	"
1130	5.50	6.00L	6.35	14.87	0.546	-46.0	0.84	25.0	"
1135	5.50	6.75L	6.36	14.89	0.546	-56.0	0.84	23.6	"
1140	5.50	7-	6.36	14.59	0.543	-62.5	0.83	21.8	decreasing turbidity
1145	5.50	7.5L	6.36	14.52	0.539	-64.5	0.83	20.7	water is clear
1150	5.50	8.25L	6.35	14.74	0.541	-69.7	0.80	18.0	
1155	5.50	8.75L	6.36	14.82	0.541	-73.6	0.78	16.0	
1200	5.50	9.5L	6.37	14.92	0.540	-77.4	0.75	14.8	

Sampling Device

Filter 400 micron Type: Peristaltic/new tubing Size: _____

SAMPLE # 01230

Sample Containers

Collection Time

Tag No.	Type	Preservative	Analytical Method	QA Remarks
<input type="checkbox"/>	Poly (500 mL)	-	EPA 310.1	Alkalinity
<input type="checkbox"/>	Poly (500 mL)	-	120.1, 300.0	Sulfate, Cl
<input checked="" type="checkbox"/>	Poly (500 mL)	H ₂ SO ₄	415.1	TOC <u>ASH 1/19</u>
<input type="checkbox"/>	Poly (500 mL)	H ₂ SO ₄	415.1	Filtered, DOC
<input type="checkbox"/>	Poly (500 mL)	HNO ₃	6010/6020	Total metals (Ar, Ba, Ca, Cd, Cr, Cu, Pb, Mg, Mn, Ni, K, Na, Zn)
<input type="checkbox"/>	Poly (500 mL)	HNO ₃	6010/6020	Filtered, Dissolved metals (As, Cd, Pb, Mn, Ni)
<input type="checkbox"/>				
<input type="checkbox"/>				

Samplers' Signature

Date

pg 1 of 2

Date _____

Date _____



GROUNDWATER SAMPLE COLLECTION FORM

319 SW Washington St, Suite 1150
Portland, OR 97204
(503) 284-5545

Well ID: MW-10
Sample ID: GW2015011909
Date: 1/19/15
Project Name: StRives - Evraz: Addtl GW Sampling Beach & Riverbank
Project Number: C1144_0204
Field Staff: AH+KM

Well Information

Monument Condition: ☒ Good ☐ Needs Repair
Well Cap Condition: ☒ Good ☒ Locked ☐ Replaced ☐ Needs Replacement
Elevation Mark: ☒ Yes ☐ Added ☐ other
Well Diameter: ☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Odor: ☐ Comments

Casing Volume

Total Well Depth: 33.15 ft ☐ Clean Bottom ☐ Muddy Bottom ☐ Not Measured
Depth to Water: 21.46 ft
Casing Volume: _____ ft (H2O) X _____ gpf = _____ gallons
3/4" = 0.02 gpf 1" = 0.04 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf

Purge Data

Pump Type: Peri Purge Start Time: 1555
Tubing Type: LDPE (new) Purge Stop Time: 1710 Purge Rate (gpm): 0.154/min
Sample Intake Depth: 2.8 ft Total volume purged: _____ Sample Rate (gpm): _____

Field Parameters

Time	Water Level (ft bTOC)	Cumulative Vol. Purged (gallons)	pH (+/- 0.1 unit)	Temperature (°C) +/- 10%	Conductivity (mS/cm) +/- 10%	ORP (mV) +/- 10%	DO (mg/L) +/- 10%	Turbidity (NTU) +/- 10%	Comments
1620	21.56	4L	6.73	14.85	0.443	-53.3	3.22	2.05	
1625	21.60	4.75L	6.70	15.01	0.469	-76.6	0.88	0.76	
1630	21.60	6L	6.70	15.00	0.502	-99.9	0.55	0.21	
1635	21.60	7L	6.68	15.00	0.533	-107.3	0.52	0.45	
1640	21.60	7.75L	6.68	14.97	0.549	-120.9	0.40	0.11	
1645	21.60	8.5L	6.68	14.99	0.560	-112.4	0.36	0.10	
1650	21.60	9.5L	6.67	14.98	0.571	-116.2	0.39	0.32	
1655	21.60	10.5L	6.67	14.93	0.579	-132.3	0.31	0.24	
1700	21.60	11L	6.67	14.97	0.588	-134.0	0.32	0.31	
1705	21.60	12.5L	6.67	14.95	0.591	-132.6	0.33	0.32	
COLLECT SAMPLE @ 1710									

Sampling Device

Filter: _____ Type: _____ Size: _____

Sample Containers

Collection Time

Tag No.	Type	Preservative	Analytical Method	QA Remarks
<input type="checkbox"/>	Poly (500 mL)	-	EPA 310.1	Alkalinity
<input type="checkbox"/>	Poly (500 mL)	-	120.1, 300.0	Sulfate, Cl
<input checked="" type="checkbox"/>	Poly (500 mL)	H ₂ SO ₄	415.1	TOC <u>1/19</u>
<input type="checkbox"/>	Poly (500 mL)	H ₂ SO ₄	415.1	Filtered, DOC
<input type="checkbox"/>	Poly (500 mL)	HNO ₃	6010/6020	Total metals (Ar, Ba, Ca, Cd, Cr, Cu, Pb, Mg, Mn, Ni, K, Na, S, Zn)
<input type="checkbox"/>	Poly (500 mL)	HNO ₃	6010/6020	Filtered, Dissolved metals (As, Cd, Pb, Mn, Ni)
<input type="checkbox"/>				
<input type="checkbox"/>				

Samplers' Signature _____

Date _____



GROUNDWATER SAMPLE COLLECTION FORM

319 SW Washington St, Suite 1150
Portland, OR 97204
(503) 284-5545

Well ID: MW-23
Sample ID: GW20150120-04
Date: 11/20/15
Project Name: StRives - Evraz: Addtl GW Sampling Beach & Riverbank
Project Number: C1144_0204
Field Staff: AJAHMSTADT + K. MARRAS

Well Information

Monument Condition: ☐ Good ☒ Needs Repair LOCK WON'T LOCK
Well Cap Condition: ☐ Good ☒ Locked ☐ Replaced ☒ Needs Replacement
Elevation Mark: ☐ Yes ☐ Added ☒ other N. SIDE OF TOP OF CASING USED
Well Diameter: ☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Odor: ☐ Comments RUST COLORED WATER INITIALLY, THEN CLEAR

Casing Volume

Total Well Depth: 14.0 ft ☐ Clean Bottom ☒ Muddy Bottom VERY SOFT ☐ Not Measured
Depth to Water: 4.82 ft
Casing Volume: _____ ft (H2O) X _____ gpf = _____ gallons
3/4" = 0.02 gpf 1" = 0.04 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf

Purge Data

Pump Type: PERI Purge Start Time: 0915
Tubing Type: LDPE NEW Purge Stop Time: 0915 Purge Rate (gpm): 0.2 LPM
Sample Intake Depth: _____ Total volume purged: 4.109 Sample Rate (gpm): _____

Field Parameters

Time	Water Level (ft bTOC)	Cumulative Vol. Purged (gallons)	pH (+/- 0.1 unit)	Temperature (°C) +/- 10%	Conductivity (mS/cm) +/- 10%	ORP (mV) +/- 10%	DO (mg/L) +/- 10%	Turbidity (NTU) +/- 10%	Comments
0915	4.84	0.75	6.67	11.15	0.237	-47	2.10	27.7	TURBID
0920	4.84	1.10	6.72	11.19	0.289	-18.0	1.55	23.9	"
0925	4.84	1.35	6.71	11.18	0.319	-28.2	1.19	13.7	
0930	4.84	1.60	6.71	11.27	0.361	-38.4	0.95	10.62	
0935	4.84	2.0	6.71	11.28	0.378	-43.0	0.87	11.3	10.93
0940	4.84	2.40	6.71	11.38	0.409	-48.1	0.82	7.02	
0945	4.84	2.60	6.71	11.40	0.442	-58.1	0.68	6.39	
0950	4.84	2.90	6.71	11.44	0.472	-65.1	0.66	3.50	
0955	4.84	3.25	6.71	11.41	0.496	-72.0	0.64	4.30	
1000	4.84	3.55	6.71	11.51	0.521	-78.5	0.60	3.50	
1005	4.84	3.75	6.72	11.55	0.538	-82.0	0.57	3.74	
1010	4.84	4.10	6.72	11.56	0.564	-86.5	0.50	2.69	3.06 *CALIBRATION RECHECKED

Sampling Device

Filter: _____ Type: _____ Size: _____ collect sample @ 10-20 TURBIDITY meter

Sample Containers

Collection Time

Tag No.	Type	Preservative	Analytical Method	QA Remarks
<input type="checkbox"/>	Poly (500 mL)	-	EPA 310.1	Alkalinity
<input type="checkbox"/>	Poly (500 mL)	-	120.1, 300.0	Sulfate, Cl
<input checked="" type="checkbox"/>	Poly (500 mL)	H ₂ SO ₄	415.1	TOC
<input type="checkbox"/>	Poly (500 mL)	H ₂ SO ₄	415.1	Filtered, DOC
<input type="checkbox"/>	Poly (500 mL)	HNO ₃	6010/6020	Total metals (As, Ba, Ca, Cd, Cr, Cu, Pb, Mg, Mn, Ni, K, Na, S, Zn)
<input type="checkbox"/>	Poly (500 mL)	HNO ₃	6010/6020	Filtered, Dissolved metals (As, Cd, Pb, Mn, Ni)
<input type="checkbox"/>				
<input type="checkbox"/>				

Samplers' Signature _____

Date _____



GROUNDWATER SAMPLE COLLECTION FORM

319 SW Washington St, Suite 1150
Portland, OR 97204
(503) 284-5545

Well ID: NW-18

Sample ID: GW2015012005

Date: 1/20/15

Project Name: StRives - Evraz: Addtl GW Sampling Beach & Riverbank

Project Number: C1144_0204

Field Staff: ANALYST/KIMBERLY

Well Information

Monument Condition:

☒ Good

☐ Needs Repair

Well Cap Condition:

☒ Good

☒ Locked

☐ Replaced

☒ Needs Replacement

Elevation Mark:

☒ Yes

☐ Added

☐ other

Well Diameter:

☒ 2-inch

☐ 4-inch

☐ 6-inch

☐ Other

Odor:

☒ ORGANIC

Comments: PARTICULATED

Casing Volume

Total Well Depth: 12.25 ft

☒ Clean Bottom

☐ Muddy Bottom

☐ Not Measured

Depth to Water: 5.04 ft

Casing Volume: _____ ft (H₂O) X _____ gpf = _____ gallons

3/4" = 0.02 gpf 1" = 0.04 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf

Purge Data

Pump Type: PERI

Purge Start Time: 1120

Tubing Type: LDPE NEW

Purge Stop Time: _____

Purge Rate (gpm): 0.1

Sample Intake Depth: _____

Total volume purged: _____

Sample Rate (gpm): _____

Field Parameters

Time	Water Level (ft bTOC)	Cumulative Vol. Purged (gallons)	pH (+/- 0.1 unit)	Temperature (°C) +/- 10%	Conductivity (mS/cm) +/- 10%	ORP (mV) +/- 10%	DO (mg/L) +/- 10%	Turbidity (NTU) +/- 10%	Comments
1200	5.15	2.3	6.40	12.57	0.482	14.0	0.82	1.20	RELATIVELY CLEAR
1205	5.15	2.6	6.45	12.64	0.482	2.9	0.80	0.92	
1210	5.15	2.9	6.47	12.49	0.483	-33.3	0.55	0.98	
1215	5.15	3.25	6.46	12.48	0.480	-38.3	0.49	1.15	
1220	5.15	3.5	6.47	12.60	0.481	-43.7	0.46	0.28	
1225	5.15	3.75	6.47	12.50	0.480	-48.5	0.38	0.87	
1230	5.15	4.0	6.48	12.70	0.482	-55.0	0.38	1.50	
1235	5.15	4.3	6.46	12.38	0.478	-57.6	0.34	1.73	
1240	5.15	4.5	6.42	12.36	0.478	-59.3	0.58	1.09	
1245	5.15	4.75	6.45	12.34	0.478	-58.3	0.34	0.40	
1250	5.15	5.0	6.45	12.40	0.479	-57.7	0.42	0.02	
1255	5.15	5.25	6.45	12.33	0.477	-57.9	0.34	0.20	

Sampling Device

Filter

Type:

Size:

SAMPLE @ 1300

Sample Containers

Collection Time

Tag No.	Type	Preservative	Analytical Method	QA Remarks
	<input type="checkbox"/> Poly (500 mL)	—	EPA 310.1	Alkalinity
	<input type="checkbox"/> Poly (500 mL)	—	120.1, 300.0	Sulfate, Cl
	<input checked="" type="checkbox"/> Poly (500 mL)	H ₂ SO ₄	415.1	TOC <u>1/19</u>
	<input type="checkbox"/> Poly (500 mL)	H ₂ SO ₄	415.1	Filtered, DOC
	<input type="checkbox"/> Poly (500 mL)	HNO ₃	6010/6020	Total metals (Ar, Ba, Ca, Cd, Cu , Pb, Mg, Mn, Hg , Ni, K, Na, Si , Zn) <u>1/19</u>
	<input type="checkbox"/> Poly (500 mL)	HNO ₃	6010/6020	Filtered, Dissolved metals (As, Cd, Pb, Mn, Ni)
	<input type="checkbox"/>			
	<input type="checkbox"/>			

Samplers' Signature

Date

sample collected at 1300

Tag No.	Type	Preservative	Analytical Method	QA Remarks
	<input type="checkbox"/> Poly (500 mL)	--	EPA 310.1	Alkalinity
	<input type="checkbox"/> Poly (500 mL)	--	120.1, 300.0	Sulfate, Cl
	<input checked="" type="checkbox"/> Poly (500 mL)	H ₂ SO ₄	415.1	TOC <i>1/19</i>
	<input type="checkbox"/> Poly (500 mL)	H ₂ SO ₄	415.1	Filtered, DOC
	<input type="checkbox"/> Poly (500 mL)	HNO ₃	6010/6020	Total metals (Ar, Ba, Ca, Cd, Cr, Cu, Pb, Mg, Mn, Hg, Ni, K, Na, Si, Zn)
	<input type="checkbox"/> Poly (500 mL)	HNO ₃	6010/6020	Filtered, Dissolved metals (As, Cd, Pb, Mn, Ni)
	<input type="checkbox"/>			
	<input type="checkbox"/>			



GROUNDWATER SAMPLE COLLECTION FORM

319 SW Washington St, Suite 1150
Portland, OR 97204
(503) 284-5545

Well ID: MW-9
Sample ID: GW2015012007
Date: 1/20/15
Project Name: StRives - Evraz: Addtl GW Sampling Beach & Riverbank
Project Number: C1144_0204
Field Staff: A. HALLSAD + K. MARTIN

Well Information

Monument Condition: ☒ Good ☐ Needs Repair
Well Cap Condition: ☒ Good ☐ Locked ☐ Replaced ☐ Needs Replacement
Elevation Mark: ☒ Yes ☐ Added ☐ other
Well Diameter: ☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Odor: ☐ Comments: BLACK PARTICULATES @ START OF PURGE

Casing Volume

Total Well Depth: 40.5 ft ☐ Clean Bottom ☒ Muddy Bottom ☐ Not Measured
Depth to Water: 31.21 ft
Casing Volume: _____ ft (H₂O) X _____ gpf = _____ gallons
3/4" = 0.02 gpf 1" = 0.04 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf

Purge Data

Pump Type: REDMIRA PURGE BLADE Purge Start Time: 1546
Tubing Type: WIDE SLIP BOMBER Purge Stop Time: _____
Sample Intake Depth: DEDICATED Purge Rate (gpm): 100 mL/min
Total volume purged: _____ Sample Rate (gpm): _____

Field Parameters

Time	Water Level (ft bTOC)	Cumulative Vol. Purged (gallons)	pH (+/- 0.1 unit)	Temperature (°C) +/- 10%	Conductivity (mS/cm) +/- 10%	ORP (mV) +/- 10%	DO (mg/L) +/- 10%	Turbidity (NTU) +/- 10%	Comments
1630	31.15	1.0	6.53	15.31	0.517	-44.4	0.96	2.00	
1635	31.15	1.15	6.52	15.45	0.522	-55.6	0.65	0.98	
1640	31.15	1.25	6.52	15.49	0.523	-61.8	0.56	0.58	
1645	31.15	1.4	6.51	15.55	0.525	-71.1	0.49	0.50	
1650	31.15	1.5	6.51	15.64	0.529	-80.4	0.40	0.63	
1655	31.15	1.75	6.51	15.63	0.528	-84.5	0.41	0.68	
1700	31.15	2	6.51	15.64	0.529	-91.5	0.29	0.49	
1705	31.15	2.15	6.51	15.61	0.527	-95.5	0.35	0.60	
1710	31.15	2.30	6.50	15.62	0.527	-96.5	0.32	0.55	
* collect sample at 1715									
* ERB COLLECTED AT 1440									

Sampling Device

Filter _____ Type: _____ Size: _____

Sample Containers

Collection Time

Tag No.	Type	Preservative	Analytical Method	QA Remarks
	<input type="checkbox"/> Poly (500 mL)	--	EPA 310.1	Alkalinity
	<input type="checkbox"/> Poly (500 mL)	--	120.1, 300.0	Sulfate, Cl
	<input checked="" type="checkbox"/> Poly (500 mL)	H ₂ SO ₄	415.1	TOC <u>1/19</u>
	<input type="checkbox"/> Poly (500 mL)	H ₂ SO ₄	415.1	Filtered, DOC
	<input type="checkbox"/> Poly (500 mL)	HNO ₃	6010/6020	Total metals (Ar, Ba, Ca, Cd, Cr, Cu, Pb, Mg, Mn, Hg, Ni, K, Na, Al, Zn)
	<input type="checkbox"/> Poly (500 mL)	HNO ₃	6010/6020	Filtered, Dissolved metals (As, Cd, Pb, Mn, Ni)
	<input type="checkbox"/> 1L Amber	--	--	<u>755</u>

Samplers' Signature _____

Date _____

ATTACHMENT C

LABORATORY REPORTS



ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T: 1-360-577-7222
F: 1-360-636-1068
www.alsglobal.com

February 0; , 2015

Analytical Report for Service Request No: K1500604

Craig Heimbucher
Integral Consulting, Inc.
319 SW Washington St.
Suite 1150
Portland, OR 97204

RE: Evraz Oregon Steel/C1144-0204

Dear Craig:

Enclosed are the results of the sample(s) submitted to our laboratory on January 21, 2015. For your reference, these analyses have been assigned our service request number **K1500604**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3363. You may also contact me via email at Lisa.Domenighini@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Lisa Domenighini
Project Manager

Page 1 of 91

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
ISO 17025	http://www.pjllabs.com/	L14-50
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdwlabservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.

ALS ENVIRONMENTAL

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/ C1144-0204
Sample Matrix: Water

Service Request No.: K1500604
Date Received: 01/21/15

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier III deliverables including summary forms for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Eight water samples were received for analysis at ALS Environmental on 01/21/15. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

General Chemistry Parameters

No anomalies associated with the analysis of these samples were observed.


Total and Dissolved Metals

Matrix Spike Recovery Exceptions:

The control criteria for matrix spike recovery of Manganese for sample GW2015011901 were not applicable. The analyzed concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

No other anomalies associated with the analysis of these samples were observed.

Approved by_



CHAIN OF CUSTODY FORM

Page 1 of 1

K1500604

Project: C1144-0204 EVRAZ-Oregon Steel

Samplers: Alkalstad & K. Martin

Integral Contact: Craig Heinricher
Office: Portland, OR
Phone: 503-943-3629

Ship to: Lab Name: ALS-Kelso
Address: 13175 13th Ave, Kelso, WA 98626
Contact: Lisa Domenighini
Phone: 360-501-3863

ANALYSES REQUESTED

Sample No.	Date	Time	Matrix	EPA 310.1 Alkalinity	EPA 310.1, 300 Sulfate, Cl	Field Filtered DOC 4/15.1	Total Metals	601006020 Field Filtered	Diss. Metals 60106	TSS 5M 25400	HARDNESS BY CALCULATION	Extra Container	Archive	Comments
GW 2015011901	1/19/15	1230	GW	X	X	X	X	X	X	X	X			Do Not Run TOC
GW 2015011902	1/19/15	1450		X	X	X	X	X	X	X	X			FOR ALL SAMPLES
GW 2015011903	1/19/15	1710		X	X	X	X	X	X	X	X			
GW 2015012004	1/20/15	1020		X	X	X	X	X	X	X	X			
GW 2015012005	1/20/15	1300		X	X	X	X	X	X	X	X			
GW 2015012006	1/20/15	1320		X	X	X	X	X	X	X	X			*
GW 2015012007	1/20/15	1715		X	X	X	X	X	X	X	X			*
ERB 2015012001	1/20/15	1440		X	X	X	X	X	X	X	X			* FILTERED METALS - PARTIAL
1/21/15 (KAMN)														
* - CL+AWK COLLECTED IN 1L AMBERS														
3 COOLERS TOTAL														

Analysis Turn Time: Normal Rush Rush Results Needed By:

Shipped by: Courier **Shipping Tracking No.:**

Condition of Samples Upon Receipt: Custody Seal Intact?

Relinquished by: [Signature] **Date/Time:** 1/21/15 11:10 **Received by:** [Signature] **Date/Time:** 1/21/15 1300

Relinquished by: [Signature] **Date/Time:** **Received by:** [Signature] **Date/Time:**

Special Instructions: Total Metals: As, Ca, Cd, Pb, Mg, Mn, Ni, K, Na
DONOT RUN TOC - ALL SAMPLES
Dissolved Metals: As, Cd, Pb, Mn, Ni 11-10
Field Filtered in 0.45 micron Filter

Annapolis
200 Harry S. Truman Pkwy
Suite 330
Annapolis, MD 21401

Denver
285 Century Place
Suite 190
Louisville, CO 80027

Portland, Oregon
319 SW Washington St
Suite 1150
Portland, OR 97204

Honolulu
3465 Waialae Ave
Suite 380
Honolulu, HI 96816

Seattle
411 1st Ave S
Suite 550
Seattle, WA 98104

Portland, Maine
45 Exchange St
Suite 200
Portland, ME 04101

Olympia
1205 West Bay Dr NW
Olympia, WA 98502



Cooler Receipt and Preservation Form

PC LISA

ent / Project: Integral Service Request K15
ceived: 1/21/15 Opened: 1/21/15 By: KS Unloaded: 1/21/15 By: KS

Samples were received via? Mail Fed Ex UPS DHL PDX Courier Hand Delivered

Samples were received in: (circle) Cooler Box Envelope Other NA

Were custody seals on coolers? NA Y N If yes, how many and where? 1, Front

If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw oler Temp	Corrected. Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
.4	-2	2.4	2.6	+2	338	NA		NA	
0	2.9	—	—	-1	347				
0	1	—	—	+1	356				

Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves

Were custody papers properly filled out (ink, signed, etc.)? NA Y N

Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N

Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N

Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N

Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N

Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N

Were VOA vials received without headspace? *Indicate in the table below.* NA Y N

Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head- space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: Method

Service Request: K1500604
Date Collected: 01/19/15 - 01/20/15
Date Received: 01/21/15
Units: mg/L
Basis: NA

Chloride

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
GW2015011901	K1500604-001	41.8	4.0	0.6	20	01/22/15 15:45	1/22/15	
GW2015011902	K1500604-002	18.0	0.40	0.06	2	01/22/15 12:50	1/22/15	
GW2015011903	K1500604-003	17.9	1.0	0.2	5	01/22/15 15:58	1/22/15	
GW2015012004	K1500604-004	39.6	4.0	0.6	20	01/22/15 16:11	1/22/15	
GW2015012005	K1500604-005	15.7	0.40	0.06	2	01/22/15 13:30	1/22/15	
GW2015012006	K1500604-006	15.7	0.40	0.06	2	01/22/15 13:43	1/22/15	
GW2015012007	K1500604-007	39.6	4.0	0.6	20	01/22/15 16:25	1/22/15	
ERB2015012001	K1500604-008	ND U	0.40	0.06	2	01/22/15 14:10	1/22/15	
Method Blank	K1500604-MB1	ND U	0.20	0.03	1	01/22/15 09:29	1/22/15	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604
Date Collected: NA
Date Received: NA
Date Analyzed: 01/22/15

Replicate Sample Summary
General Chemistry Parameters

Sample Name: Batch QC
Lab Code: KQ1500623-03

Units: mg/L
Basis: NA

					Duplicate Sample KQ1500623- 03DUP			
Analyte Name	Analysis Method	MRL	MDL	Sample Result	Result	Average	RPD	RPD Limit
Chloride	300.0	0.40	0.06	0.41	0.41	0.414	<1	20

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604
Date Collected: N/A
Date Received: N/A
Date Analyzed: 01/22/15
Date Extracted: 01/22/15

Duplicate Matrix Spike Summary
Chloride

Sample Name: Batch QC
Lab Code: KQ1500623-03
Analysis Method: 300.0
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike KQ1500623-03MS		Result	Duplicate Matrix Spike KQ1500623-03DMS		% Rec Limits	RPD	RPD Limit
			Spike Amount	% Rec		Spike Amount	% Rec			
Chloride	0.41	4.12	4.00	93	4.14	4.00	93	90-110	<1	20

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ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604
Date Analyzed: 01/22/15
Date Extracted: 01/22/15

Lab Control Sample Summary
Chloride

Analysis Method: 300.0
Prep Method: Method

Units: mg/L
Basis: NA
Analysis Lot: 430184

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1500604-LCS1	4.88	5.00	98	90-110

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated**Service Request:** K1500604**Project:** Evraz Oregon Steel/C1144-0204**Continuing Calibration Verification (CCV) Summary****Chloride****Analysis Method:** 300.0**Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
CCV1	430184	KQ1500624-01	01/22/15 09:02	5.00	4.92	98	90-110
CCV2	430184	KQ1500624-02	01/22/15 11:43	5.00	4.90	98	90-110
CCV3	430184	KQ1500624-03	01/22/15 14:23	5.00	4.89	98	90-110
CCV4	430184	KQ1500624-04	01/22/15 17:05	5.00	4.94	99	90-110
CCV5	430184	KQ1500624-05	01/22/15 18:40	5.00	4.92	98	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204

Service Request: K1500604

Continuing Calibration Blank (CCB) Summary
Chloride

Analysis Method: 300.0

Units: mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
CCB1	430184	KQ1500624-06	01/22/15 09:16	0.20	0.03	ND	U
CCB2	430184	KQ1500624-07	01/22/15 11:56	0.20	0.03	ND	U
CCB3	430184	KQ1500624-08	01/22/15 14:37	0.20	0.03	ND	U
CCB4	430184	KQ1500624-09	01/22/15 17:19	0.20	0.03	ND	U
CCB5	430184	KQ1500624-10	01/22/15 18:54	0.20	0.03	ND	U

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water
Analysis Method: 300.0
Prep Method: Method

Service Request: K1500604
Date Collected: 01/19/15 - 01/20/15
Date Received: 01/21/15
Units: mg/L
Basis: NA

Sulfate

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
GW2015011901	K1500604-001	ND U	0.20	0.02	2	01/22/15 12:36	1/22/15	
GW2015011902	K1500604-002	6.54	0.20	0.02	2	01/22/15 12:50	1/22/15	
GW2015011903	K1500604-003	ND U	0.20	0.02	2	01/22/15 13:03	1/22/15	
GW2015012004	K1500604-004	4.22	0.20	0.02	2	01/22/15 13:16	1/22/15	
GW2015012005	K1500604-005	0.64	0.20	0.02	2	01/22/15 13:30	1/22/15	
GW2015012006	K1500604-006	0.71	0.20	0.02	2	01/22/15 13:43	1/22/15	
GW2015012007	K1500604-007	0.14 J	0.20	0.02	2	01/22/15 13:56	1/22/15	
ERB2015012001	K1500604-008	ND U	0.20	0.02	2	01/22/15 14:10	1/22/15	
Method Blank	K1500604-MB1	ND U	0.10	0.01	1	01/22/15 09:29	1/22/15	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604
Date Collected: NA
Date Received: NA
Date Analyzed: 01/22/15

Replicate Sample Summary
General Chemistry Parameters

Sample Name: Batch QC
Lab Code: KQ1500623-03

Units: mg/L
Basis: NA

					Duplicate Sample KQ1500623- 03DUP			
Analyte Name	Analysis Method	MRL	MDL	Sample Result	Result	Average	RPD	RPD Limit
Sulfate	300.0	0.20	0.02	0.89	0.87	0.881	3	20

Results flagged with an asterisk (*) indicate values outside control criteria.

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604
Date Collected: N/A
Date Received: N/A
Date Analyzed: 01/22/15
Date Extracted: 01/22/15

Duplicate Matrix Spike Summary
Sulfate

Sample Name: Batch QC
Lab Code: KQ1500623-03
Analysis Method: 300.0
Prep Method: Method

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Result	Matrix Spike KQ1500623-03MS		Result	Duplicate Matrix Spike KQ1500623-03DMS		% Rec Limits	RPD	RPD Limit
			Spike Amount	% Rec		Spike Amount	% Rec			
Sulfate	0.89	4.93	4.00	101	4.97	4.00	102	90-110	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604
Date Analyzed: 01/22/15
Date Extracted: 01/22/15

Lab Control Sample Summary
Sulfate

Analysis Method: 300.0
Prep Method: Method

Units: mg/L
Basis: NA
Analysis Lot: 430184

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1500604-LCS1	5.04	5.00	101	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204

Service Request: K1500604

Continuing Calibration Verification (CCV) Summary

Sulfate

Analysis Method: 300.0

Units: mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
CCV1	430184	KQ1500624-01	01/22/15 09:02	5.00	5.03	101	90-110
CCV2	430184	KQ1500624-02	01/22/15 11:43	5.00	5.05	101	90-110
CCV3	430184	KQ1500624-03	01/22/15 14:23	5.00	5.07	101	90-110
CCV4	430184	KQ1500624-04	01/22/15 17:05	5.00	5.08	102	90-110
CCV5	430184	KQ1500624-05	01/22/15 18:40	5.00	5.06	101	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204

Service Request: K1500604

Continuing Calibration Blank (CCB) Summary
Sulfate

Analysis Method: 300.0

Units: mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
CCB1	430184	KQ1500624-06	01/22/15 09:16	0.10	0.01	ND	U
CCB2	430184	KQ1500624-07	01/22/15 11:56	0.10	0.01	ND	U
CCB3	430184	KQ1500624-08	01/22/15 14:37	0.10	0.01	ND	U
CCB4	430184	KQ1500624-09	01/22/15 17:19	0.10	0.01	ND	U
CCB5	430184	KQ1500624-10	01/22/15 18:54	0.10	0.01	ND	U

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water
Analysis Method: 415.1
Prep Method: None

Service Request: K1500604
Date Collected: 01/19/15 - 01/20/15
Date Received: 01/21/15
Units: mg/L
Basis: NA

Carbon, Dissolved Organic

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
GW2015011901	K1500604-001	4.68	0.50	0.07	1	01/27/15 22:00	
GW2015011902	K1500604-002	3.75	0.50	0.07	1	01/27/15 22:00	
GW2015011903	K1500604-003	9.2	1.0	0.2	2	01/27/15 22:00	
GW2015012004	K1500604-004	9.8	2.0	0.3	4	01/27/15 22:00	
GW2015012005	K1500604-005	4.29	0.50	0.07	1	01/27/15 22:00	
GW2015012006	K1500604-006	4.35	0.50	0.07	1	01/27/15 22:00	
GW2015012007	K1500604-007	6.3	1.0	0.2	2	01/27/15 22:00	
ERB2015012001	K1500604-008	0.22 J	0.50	0.07	1	01/27/15 22:00	
Method Blank	K1500604-MB1	0.10 J	0.50	0.07	1	01/27/15 22:00	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request:K1500604
Date Collected:01/19/15 - 01/20/15
Date Received:01/21/15

Analysis Method: 415.1
Prep Method: None

Units:mg/L
Basis:NA

Replicate Sample Summary
Carbon, Dissolved Organic

Sample Name:	Lab Code:	MRL	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
GW2015011901	K1500604-001DUP	0.50	0.07	4.68	4.47	4.58	5	33	01/27/15
GW2015011902	K1500604-002DUP	0.50	0.07	3.75	3.57	3.66	5	33	01/27/15
GW2015011903	K1500604-003DUP	1.0	0.2	9.2	9.0	9.10	2	33	01/27/15
GW2015012004	K1500604-004DUP	2.0	0.3	9.8	9.9	9.88	<1	33	01/27/15
GW2015012005	K1500604-005DUP	0.50	0.07	4.29	4.20	4.25	2	33	01/27/15
GW2015012006	K1500604-006DUP	0.50	0.07	4.35	4.29	4.32	1	33	01/27/15
GW2015012007	K1500604-007DUP	1.0	0.2	6.3	6.3	6.28	<1	33	01/27/15
ERB2015012001	K1500604-008DUP	0.50	0.07	0.22 J	0.21 J	0.213	6	33	01/27/15

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ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604
Date Collected: 01/19/15
Date Received: 01/21/15
Date Analyzed: 01/27/15
Date Extracted: NA

Matrix Spike Summary
Carbon, Dissolved Organic

Sample Name: GW2015011901
Lab Code: K1500604-001
Analysis Method: 415.1
Prep Method: None

Units: mg/L
Basis: NA

Matrix Spike
K1500604-001MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Dissolved Organic	4.68	30.9	25.0	105	83-117

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ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604
Date Analyzed: 01/27/15
Date Extracted: NA

Lab Control Sample Summary
Carbon, Dissolved Organic

Analysis Method: 415.1
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 430637

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1500604-LCS1	17.8	18.1	98	83-117

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated**Service Request:** K1500604**Project:** Evraz Oregon Steel/C1144-0204**Continuing Calibration Verification (CCV) Summary****Carbon, Dissolved Organic****Analysis Method:** 415.1**Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
CCV1	430637	KQ1500837-27	01/27/15 22:00	25.0	25.1	101	90-110
CCV2	430637	KQ1500837-28	01/27/15 22:00	25.0	25.2	101	90-110
CCV3	430637	KQ1500837-29	01/27/15 22:00	25.0	25.2	101	90-110
CCV4	430637	KQ1500837-30	01/27/15 22:00	25.0	25.0	100	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204

Service Request:K1500604

Continuing Calibration Blank (CCB) Summary
Carbon, Dissolved Organic

Analysis Method: 415.1

Units:mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
CCB1	430637	KQ1500837-31	01/27/15 22:00	0.50	0.07	0.11	J
CCB2	430637	KQ1500837-32	01/27/15 22:00	0.50	0.07	0.20	J
CCB3	430637	KQ1500837-33	01/27/15 22:00	0.50	0.07	ND	U
CCB4	430637	KQ1500837-34	01/27/15 22:00	0.50	0.07	ND	U

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water
Analysis Method: SM 2320 B
Prep Method: None

Service Request: K1500604
Date Collected: 01/19/15 - 01/20/15
Date Received: 01/21/15
Units: mg/L
Basis: NA

Alkalinity as CaCO₃, Total

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
GW2015011901	K1500604-001	140	15	3	1	01/30/15 16:25	
GW2015011902	K1500604-002	79	15	3	1	01/30/15 16:25	
GW2015011903	K1500604-003	236	15	3	1	01/30/15 16:25	
GW2015012004	K1500604-004	298	15	3	1	01/30/15 16:25	
GW2015012005	K1500604-005	249	15	3	1	01/30/15 16:25	
GW2015012006	K1500604-006	250	15	3	1	01/30/15 16:25	
GW2015012007	K1500604-007	167	15	3	1	01/30/15 16:25	
ERB2015012001	K1500604-008	ND U	2.0	1.0	1	02/03/15 13:45	
Method Blank	K1500604-MB1	6 J	15	3	1	01/30/15 16:25	
Method Blank	K1500604-MB2	ND U	2.0	1.0	1	02/03/15 13:45	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604**Date Collected:** 01/20/15**Date Received:** 01/21/15**Date Analyzed:** 01/30/15

Replicate Sample Summary
General Chemistry Parameters

Sample Name: ERB2015012001**Units:** mg/L**Lab Code:** K1500604-008**Basis:** NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1500604-008DUP	Average	RPD	RPD Limit
					Result			
Alkalinity as CaCO ₃ , Total	SM 2320 B	2.0	1.0	ND U	5.9	NC	NC	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
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QA/QC Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604
Date Analyzed: 01/30/15
Date Extracted: NA

Lab Control Sample Summary
Alkalinity as CaCO₃, Total

Analysis Method: SM 2320 B
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 431102

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1500604-LCS1	69.0	65	106	90-110

ALS Group USA, Corp.
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QA/QC Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604
Date Analyzed: 02/03/15
Date Extracted: NA

Lab Control Sample Summary
Alkalinity as CaCO₃, Total

Analysis Method: SM 2320 B
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 431342

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1500604-LCS2	34.6	34.4	101	90-110

ALS Group USA, Corp.
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Analytical Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water
Analysis Method: SM 2540 D
Prep Method: None

Service Request: K1500604
Date Collected: 01/19/15 - 01/20/15
Date Received: 01/21/15
Units: mg/L
Basis: NA

Solids, Total Suspended (TSS)

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
GW2015011901	K1500604-001	67	10	-	1	01/26/15 14:53	
GW2015011902	K1500604-002	ND U	5.0	-	1	01/26/15 14:53	
GW2015011903	K1500604-003	82.0	5.0	-	1	01/26/15 14:53	
GW2015012004	K1500604-004	21.0	5.0	-	1	01/26/15 14:53	
GW2015012005	K1500604-005	12.0	5.0	-	1	01/26/15 14:53	
GW2015012006	K1500604-006	10.0	5.0	-	1	01/26/15 14:53	
GW2015012007	K1500604-007	19.0	5.0	-	1	01/26/15 14:53	
ERB2015012001	K1500604-008	ND U	5.0	-	1	01/26/15 14:53	
Method Blank	K1500604-MB1	ND U	4.0	-	1	01/26/15 14:53	
Method Blank	K1500604-MB2	ND U	4.0	-	1	01/26/15 14:53	

ALS Group USA, Corp.

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QA/QC Report

Client: Integral Consulting, Incorporated
Project Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604**Date Collected:** 01/20/15**Date Received:** 01/21/15**Date Analyzed:** 01/26/15

Replicate Sample Summary
General Chemistry Parameters

Sample Name: ERB2015012001**Units:** mg/L**Lab Code:** K1500604-008**Basis:** NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1500604-008DUP	Average	RPD	RPD Limit
					Result			
Solids, Total Suspended (TSS)	SM 2540 D	5.0	-	ND U	ND U	NC	NC	10

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604
Date Analyzed: 01/26/15
Date Extracted: NA

Lab Control Sample Summary
Solids, Total Suspended (TSS)

Analysis Method: SM 2540 D
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 430496

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1500604-LCS1	270	280	96	85-115

ALS Group USA, Corp.
dba ALS Environmental
Analytical Report

Client: Integral Consulting, Incorporated
Project: Evraz Oregon Steel/C1144-0204
Sample Matrix: Water

Service Request: K1500604
Date Collected: 01/19,20/15
Date Received: 01/21/15

Hardness as CaCO₃

Prep Method: CLAA
Analysis Method: 6010C/SM 2340B
Test Notes:

Units: mg/L (ppm)
Basis: NA

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
GW2015011901	K1500604-001	0.07	0.004	1	01/22/15	01/23/15	172	
GW2015011902	K1500604-002	0.07	0.004	1	01/22/15	01/23/15	23.0	
GW2015011903	K1500604-003	0.07	0.004	1	01/22/15	01/23/15	203	
GW2015012004	K1500604-004	0.07	0.004	1	01/22/15	01/23/15	256	
GW2015012005	K1500604-005	0.07	0.004	1	01/22/15	01/23/15	241	
GW2015012006	K1500604-006	0.07	0.004	1	01/22/15	01/23/15	240	
GW2015012007	K1500604-007	0.07	0.004	1	01/22/15	01/23/15	103	
ERB2015012001	K1500604-008	0.07	0.004	1	01/22/15	01/23/15	0.31	
Method Blank	K1500604-MB	0.07	0.004	1	01/22/15	01/23/15	0.004 J	

ALS Group USA, Corp.

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QA/QC Report**Client:** Integral Consulting, Incorporated**Project:** Evraz Oregon Steel/C1144-0204**Sample Matrix:** Water**Service Request:** K1500604**Date Collected:** 01/19/15**Date Received:** 01/21/15**Date Extracted:** 01/22/15**Date Analyzed:** 01/23/15**Duplicate Summary****Metals**

Sample Name: GW2015011901

Lab Code: K1500604-001D

Test Notes:

Units: mg/L (ppm)

Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Hardness as CaCO ₃	CLAA	6010C/SM 2340B	0.07	172	171	172	<1	

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/19/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015011901 **Lab Code:** K1500604-001

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	4.7		
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/29/15	0.019	J	
Calcium	6010C	20.0	0.9	1.0	01/22/15	01/23/15	31600		
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.026		
Magnesium	6010C	5.0	0.3	1.0	01/22/15	01/23/15	22500		
Manganese	6020A	0.100	0.006	1.0	01/22/15	01/27/15	1480		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	94.3		
Potassium	6010C	200	60.0	1.0	01/22/15	01/23/15	1320		
Sodium	6010C	200	20.0	1.0	01/22/15	01/23/15	15300		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/19/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015011901 **Lab Code:** K1500604-001DISS

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	4.8		
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.013	J	
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.009	J	
Manganese	6020A	0.100	0.006	1.0	01/22/15	01/27/15	1480		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	89.9		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/19/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015011902 **Lab Code:** K1500604-002

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	9.4		
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/29/15	0.031		
Calcium	6010C	20.0	0.9	1.0	01/22/15	01/23/15	8590		
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.319		
Magnesium	6010C	5.0	0.3	1.0	01/22/15	01/23/15	381		
Manganese	6020A	0.100	0.006	1.0	01/22/15	01/27/15	23.1		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	4.60		
Potassium	6010C	200	60.0	1.0	01/22/15	01/23/15	2480		
Sodium	6010C	200	20.0	1.0	01/22/15	01/23/15	39500		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/19/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015011902 **Lab Code:** K1500604-002DISS

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	9.1		
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/29/15	0.031		
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.067		
Manganese	6020A	0.100	0.006	1.0	01/22/15	01/27/15	3.62		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	4.31		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/19/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015011903 **Lab Code:** K1500604-003

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	29.4		
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.006	J	
Calcium	6010C	20.0	0.9	1.0	01/22/15	01/23/15	50100		
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.008	J	
Magnesium	6010C	5.0	0.3	1.0	01/22/15	01/23/15	18900		
Manganese	6020A	5.00	0.300	50.0	01/22/15	01/27/15	5600		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	2.82		
Potassium	6010C	200	60.0	1.0	01/22/15	01/23/15	1940		
Sodium	6010C	200	20.0	1.0	01/22/15	01/23/15	19700		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/19/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015011903 **Lab Code:** K1500604-003DISS

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	31.0		
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.005	U	
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.028		
Manganese	6020A	5.00	0.300	50.0	01/22/15	01/27/15	5860		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	2.64		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/20/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015012004 **Lab Code:** K1500604-004

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	8.0		
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/29/15	0.012	J	
Calcium	6010C	20.0	0.9	1.0	01/22/15	01/23/15	52500		
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.069		
Magnesium	6010C	5.0	0.3	1.0	01/22/15	01/23/15	30400		
Manganese	6020A	5.00	0.300	50.0	01/22/15	01/27/15	3840		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	13.9		
Potassium	6010C	200	60.0	1.0	01/22/15	01/23/15	2430		
Sodium	6010C	200	20.0	1.0	01/22/15	01/23/15	53900		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/20/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015012004 **Lab Code:** K1500604-004DISS

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	7.6		
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/29/15	0.008	J	
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.061		
Manganese	6020A	5.00	0.300	50.0	01/22/15	01/27/15	3810		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	14.0		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/20/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015012005 **Lab Code:** K1500604-005

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	0.5	J	
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.005	J	
Calcium	6010C	20.0	0.9	1.0	01/22/15	01/23/15	41700		
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.007	J	
Magnesium	6010C	5.0	0.3	1.0	01/22/15	01/23/15	33200		
Manganese	6020A	0.100	0.006	1.0	01/22/15	01/27/15	471		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	1.23		
Potassium	6010C	200	60.0	1.0	01/22/15	01/23/15	495		
Sodium	6010C	200	20.0	1.0	01/22/15	01/23/15	12900		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/20/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015012005 **Lab Code:** K1500604-005DISS

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	0.5	J	
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.005	U	
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.005	J	
Manganese	6020A	0.100	0.006	1.0	01/22/15	01/27/15	475		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	1.30		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/20/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015012006 **Lab Code:** K1500604-006

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	0.5	J	
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.010	J	
Calcium	6010C	20.0	0.9	1.0	01/22/15	01/23/15	41700		
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.006	J	
Magnesium	6010C	5.0	0.3	1.0	01/22/15	01/23/15	32900		
Manganese	6020A	0.100	0.006	1.0	01/22/15	01/27/15	470		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	1.24		
Potassium	6010C	200	60.0	1.0	01/22/15	01/23/15	487		
Sodium	6010C	200	20.0	1.0	01/22/15	01/23/15	13000		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/20/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015012006 **Lab Code:** K1500604-006DISS

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	0.4	J	
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.005	U	
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.005	U	
Manganese	6020A	0.100	0.006	1.0	01/22/15	01/27/15	472		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	1.17		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/20/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015012007 **Lab Code:** K1500604-007

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	18.1		
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.011	J	
Calcium	6010C	20.0	0.9	1.0	01/22/15	01/23/15	25800		
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.016	J	
Magnesium	6010C	5.0	0.3	1.0	01/22/15	01/23/15	9430		
Manganese	6020A	5.00	0.300	50.0	01/22/15	01/27/15	2410		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	5.58		
Potassium	6010C	200	60.0	1.0	01/22/15	01/23/15	2360		
Sodium	6010C	200	20.0	1.0	01/22/15	01/23/15	53100		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/20/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: GW2015012007 **Lab Code:** K1500604-007DISS

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	17.9		
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.011	J	
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.009	J	
Manganese	6020A	5.00	0.300	50.0	01/22/15	01/27/15	2260		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	5.57		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/20/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: ERB2015012001 **Lab Code:** K1500604-008

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	0.1	U	
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.005	U	
Calcium	6010C	20.0	0.9	1.0	01/22/15	01/23/15	87.0		
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.006	J	
Magnesium	6010C	5.0	0.3	1.0	01/22/15	01/23/15	2.2	J	
Manganese	6020A	0.100	0.006	1.0	01/22/15	01/27/15	0.400		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	0.09	J	
Potassium	6010C	200	60.0	1.0	01/22/15	01/23/15	60.0	U	
Sodium	6010C	200	20.0	1.0	01/22/15	01/23/15	20.0	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Date Collected:** 01/20/15
Project Name: Evraz Oregon Steel **Date Received:** 01/21/15
Matrix: WATER **Units:** ug/L
Basis: NA

Sample Name: ERB2015012001 **Lab Code:** K1500604-008DISS

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	0.1	U	
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.005	U	
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.005	U	
Manganese	6020A	0.100	0.006	1.0	01/22/15	01/27/15	0.164		
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	0.05	J	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204 Date Collected:

Project Name: Evraz Oregon Steel **Date Received:**

Matrix: WATER Units: ug/L

Basis: NA

Sample Name: Method Blank Lab Code: K1500604-MB

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	0.1	1.0	01/22/15	01/27/15	0.1	U	
Cadmium	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.005	U	
Calcium	6010C	20.0	0.9	1.0	01/22/15	01/23/15	1.1	J	
Lead	6020A	0.020	0.005	1.0	01/22/15	01/27/15	0.007	J	
Magnesium	6010C	5.0	0.3	1.0	01/22/15	01/23/15	0.4	J	
Manganese	6020A	0.100	0.006	1.0	01/22/15	01/27/15	0.009	J	
Nickel	6020A	0.20	0.02	1.0	01/22/15	01/27/15	0.02	U	
Potassium	6010C	200	60.0	1.0	01/22/15	01/23/15	60.0	U	
Sodium	6010C	200	20.0	1.0	01/22/15	01/23/15	20.0	U	

Comments:

Metals
- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

ICV Source: Inorganic Ventures

CCV Source: ALS MIXED

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					Method
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Arsenic	25.0	24.5	98	25.0	24.9	100	24.8	99	6020A
Cadmium	12.5	12.6	101	25.0	25.2	101	25.2	101	6020A
Calcium	5000	4862	97	500	486	97	498	100	6010C
Calcium	12500	12370	99	10000	9688	97	10010	100	6010C
Lead	25.0	24.7	99	25.0	25.0	100	25.2	101	6020A
Magnesium	5000	4911	98	250	249	100	252	101	6010C
Magnesium	12500	12590	101	10000	9990	100	10200	102	6010C
Manganese	25.0	24.9	100	25.0	24.6	98	23.9	96	6020A
Nickel	25.0	24.6	98	25.0	24.8	99	23.8	95	6020A
Potassium	12500	12470	100	10000	10130	101	10050	100	6010C
Sodium	12500	12660	101	10000	9975	100	10090	101	6010C

Metals
- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

ICV Source: Inorganic Ventures

CCV Source: ALS MIXED

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					Method
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Arsenic				25.0	24.8	99	24.9	100	6020A
Cadmium				25.0	25.1	100	25.1	100	6020A
Calcium				10000	10240	102			6010C
Calcium				500	498	100			6010C
Lead				25.0	25.2	101	25.1	100	6020A
Magnesium				10000	10400	104			6010C
Magnesium				250	252	101			6010C
Manganese				25.0	24.4	98	24.3	97	6020A
Nickel				25.0	24.2	97	24.5	98	6020A
Potassium				10000	10100	101			6010C
Sodium				10000	10240	102			6010C

Metals
- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

ICV Source: Inorganic Ventures

CCV Source: ALS MIXED

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					Method
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Arsenic				25.0	25.1	100	25.3	101	6020A
Cadmium				25.0	25.4	102	25.4	102	6020A
Lead				25.0	24.8	99	24.9	100	6020A
Manganese				25.0	24.6	98	24.5	98	6020A
Nickel				25.0	24.4	98	24.3	97	6020A

Metals
 - 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204
Project Name: Evraz Oregon Steel

ICV Source: Inorganic Ventures **CCV Source:** ALS MIXED

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					Method
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Cadmium	12.5	13.0	104	25.0	24.8	99	25.0	100	6020A

Metals

- 2a -

LOW LEVEL INITIAL CALIBRATION AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION
Client: Integral Consulting, Incorporated
SDG No.: K1500604
Contract: C1144-0204
Lab Code: ALSK
Case No.: _____

SAS No.: _____

Initial Calibration Source: Inorganic Ventures
Continuing Calibration Source: ALS MIXED

Sample ID	Analyte	Result ug/L	True Value ug/L	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
LLICV1									
	Calcium	21	20	105	70.0 - 130.0	P	01/23/15	08:44	012315AICP
	Magnesium	5	5	100	70.0 - 130.0	P	01/23/15	08:44	012315AICP
	Potassium	230	200	115	70.0 - 130.0	P	01/23/15	08:44	012315AICP
	Sodium	213	200	106	70.0 - 130.0	P	01/23/15	08:44	012315AICP
LLCCV1									
	Calcium	20	20	100	70.0 - 130.0	P	01/23/15	11:00	012315AICP
	Magnesium	5	5	100	70.0 - 130.0	P	01/23/15	11:00	012315AICP
	Potassium	199	200	100	70.0 - 130.0	P	01/23/15	11:00	012315AICP
	Sodium	195	200	98	70.0 - 130.0	P	01/23/15	11:00	012315AICP
LLICVW1									
	Arsenic	0.45	0.5	90	70.0 - 130.0	MS	01/27/15	08:02	012715AMS
	Cadmium	0.022	0.02	110	70.0 - 130.0	MS	01/27/15	08:02	012715AMS
	Lead	0.021	0.02	105	70.0 - 130.0	MS	01/27/15	08:02	012715AMS
	Manganese	0.047	0.05	94	70.0 - 130.0	MS	01/27/15	08:02	012715AMS
	Nickel	0.25	0.20	125	70.0 - 130.0	MS	01/27/15	08:02	012715AMS
LLCCVW1									
	Arsenic	0.55	0.5	110	70.0 - 130.0	MS	01/27/15	09:00	012715AMS
	Cadmium	0.024	0.02	120	70.0 - 130.0	MS	01/27/15	09:00	012715AMS
	Lead	0.025	0.02	125	70.0 - 130.0	MS	01/27/15	09:00	012715AMS
	Manganese	0.042	0.05	84	70.0 - 130.0	MS	01/27/15	09:00	012715AMS
	Nickel	0.25	0.20	125	70.0 - 130.0	MS	01/27/15	09:00	012715AMS
LLCCVW2									
	Arsenic	0.46	0.5	92	70.0 - 130.0	MS	01/27/15	10:45	012715AMS
	Cadmium	0.021	0.02	105	70.0 - 130.0	MS	01/27/15	10:45	012715AMS
	Lead	0.020	0.02	100	70.0 - 130.0	MS	01/27/15	10:45	012715AMS
	Nickel	0.22	0.20	110	70.0 - 130.0	MS	01/27/15	10:45	012715AMS
LLCCVW2									
	Manganese	0.104	0.10	104	70.0 - 130.0	MS	01/27/15	10:49	012715AMS

ALS Group USA, Corp.

dba ALS Environmental

Metals

- 2a -

LOW LEVEL INITIAL CALIBRATION AND LOW LEVEL CONTINUING CALIBRATION VERIFICATIONClient: Integral Consulting, IncorporatedSDG No.: K1500604Contract: C1144-0204Lab Code: ALSK

Case No.: _____ SAS No.: _____

Initial Calibration Source: Inorganic VenturesContinuing Calibration Source: ALS MIXED

Sample ID	Analyte	Result ug/L	True Value ug/L	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
LLCCVW3									
	Arsenic	0.53	0.5	106	70.0 - 130.0	MS	01/27/15	12:34	012715AMS
	Cadmium	0.022	0.02	110	70.0 - 130.0	MS	01/27/15	12:34	012715AMS
	Lead	0.021	0.02	105	70.0 - 130.0	MS	01/27/15	12:34	012715AMS
	Nickel	0.24	0.20	120	70.0 - 130.0	MS	01/27/15	12:34	012715AMS
LLCCVW3									
	Manganese	0.080	0.10	80	70.0 - 130.0	MS	01/27/15	12:47	012715AMS
LLICVW2									
	Cadmium	0.024	0.02	120	70.0 - 130.0	MS	01/29/15	10:32	012915CMS
LLCCVW1									
	Cadmium	0.019	0.02	95	70.0 - 130.0	MS	01/29/15	11:39	012915CMS

Metals

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BLANKS

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analyte	Initial Calib. Blank (ug/L)		Continuing Calibration Blank (ug/L)						Method
		C	1	C	2	C	3	C	
Arsenic	0.10	U	0.10	U	0.10	U	0.10	U	6020A
Cadmium	0.017	J	0.006	J	0.013	J	0.016	J	6020A
Calcium	0.9	U	-1.0	J	0.9	U	0.9	U	6010C
Lead	0.016	J	0.005	U	0.015	J	0.015	J	6020A
Magnesium	0.8	J	0.3	U	0.6	J	0.3	U	6010C
Manganese	0.017	J	0.006	U	0.006	U	0.006	U	6020A
Nickel	0.02	J	0.02	U	0.02	U	0.02	U	6020A
Potassium	60.0	U	60.0	U	60.0	U	60.0	U	6010C
Sodium	20.0	U	20.0	U	20.0	U	20.0	U	6010C

Metals

- 3 -
BLANKS

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analyte	Initial Calib. Blank (ug/L)		Continuing Calibration Blank (ug/L)						Method
		C	1	C	2	C	3	C	
Arsenic			0.10	U	0.10	U	0.10	U	6020A
Cadmium			0.005	U	0.005	U	0.007	J	6020A
Lead			0.005	U	0.005	U	0.006	J	6020A
Manganese			0.041	J	0.013	J	0.006	U	6020A
Nickel			0.02	U	-0.02	J	0.02	U	6020A

Metals
 - 3 -
 BLANKS

Client: Integral Consulting, Incorporate Service Request: K1500604
 Project No.: C1144-0204
 Project Name: Evraz Oregon Steel

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analyte	Initial Calib. Blank (ug/L)		Continuing Calibration Blank (ug/L)						Method
		C	1	C	2	C	3	C	
Cadmium	0.005	U	0.005	U	0.005	U			6020A

Metals
- 4 -

ICP INTERFERENCE CHECK SAMPLE

Client: Integral Consulting, Incorporate Service Request: K1500604
Project No.: C1144-0204
Project Name: Evraz Oregon Steel

ICP ID Number: K-ICP-MS-03 ICS Source: Inorganic Ventures

Concentration Units): ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Arsenic	0.00	25.00	0.10	24.44	98			
Cadmium	0.00	25.00	0.12	24.43	98			
Lead	0.0		0.11	0.12				
Manganese	0.0	50.0	1.48	49.72	99			
Nickel	0.0	50.0	0.80	46.8	94			

Metals
 - 4 -

ICP INTERFERENCE CHECK SAMPLE

Client: Integral Consulting, Incorporate Service Request: K1500604
 Project No.: C1144-0204
 Project Name: Evraz Oregon Steel

ICP ID Number: K-ICP-AES-03 ICS Source: Inorganic Ventures

Concentration Units): ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Calcium	500000.0	500000.0	480200.0	482000.0	96			
Magnesium	500000.0	500000.0	371500.0	365300.0	73			
Potassium	0.0		-50.6	-88.4				
Sodium	0.0		-0.4	8.2				

Metals
- 4 -

ICP INTERFERENCE CHECK SAMPLE

Client: Integral Consulting, Incorporate Service Request: K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

ICP ID Number: K-ICP-MS-03 ICS Source: Inorganic Ventures

Concentration Units): ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Cadmium	0.00	25.00	0.13	24.80	99			

Metals
- 5A -
SPIKE SAMPLE RECOVERY

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Units:** UG/L
Project Name: Evraz Oregon Steel **Basis:** NA
Matrix: WATER

Sample Name: GW2015011901S

Lab Code: K1500604-001S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	75 - 125	53.9		4.7		50.00	98.4		6020A
Cadmium	75 - 125	25.4		0.019	J	25.00	101.5		6020A
Calcium	75 - 125	41500		31600		10000.00	99.0		6010C
Lead	75 - 125	48.7		0.026		50.00	97.3		6020A
Magnesium	75 - 125	32600		22500		10000.00	101.0		6010C
Manganese		1530		1480		25.00	200.0		6020A
Nickel	75 - 125	118		94.3		25.00	94.8		6020A
Potassium	75 - 125	11500		1320		10000.00	101.8		6010C
Sodium	75 - 125	25300		15300		10000.00	100.0		6010C

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

- 5B -

POST SPIKE SAMPLE RECOVERY

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Units:** UG/L
Project Name: Evraz Oregon Steel **Basis:** NA
Matrix: WATER

Sample Name: GW2015011901A

Lab Code: K1500604-001A

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	80 - 120	25.0		4.7		20.0	102		6020A
Cadmium	80 - 120	20.928		0.019		20.0	105		6020A
Calcium	80 - 120	42990.0		31640.0		12500	91		6010C
Lead	80 - 120	20.007		0.026		20.0	100		6020A
Magnesium	80 - 120	34170.0		22530.0		12500	93		6010C
Manganese	80 - 120	1505.175		1482.917		20.0	111		6020A
Nickel	80 - 120	112.52		94.28		20.0	91		6020A
Potassium	80 - 120	13620.0		1317.0		12500	98		6010C
Sodium	80 - 120	27130.0		15260.0		12500	95		6010C

Metals
- 6 -
DUPLICATES

Client: Integral Consulting, Incorporate **Service Request:** K1500604
Project No.: C1144-0204 **Units:** UG/L
Project Name: Evraz Oregon Steel **Basis:** NA
Matrix: WATER

Sample Name: GW2015011901D

Lab Code: K1500604-001D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic	20	4.7		4.9		4.2		6020A
Cadmium		0.019	J	0.018	J	5.4		6020A
Calcium	20	31600		31700		0.3		6010C
Lead		0.026		0.025		3.9		6020A
Magnesium	20	22500		22300		0.9		6010C
Manganese	20	1480		1510		2.0		6020A
Nickel	20	94.3		95.5		1.3		6020A
Potassium	20	1320		1340		1.5		6010C
Sodium	20	15300		15200		0.7		6010C

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals
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 LABORATORY CONTROL SAMPLE

Client: Integral Consulting, Incorporate Service Request: K1500604
 Project No.: C1144-0204
 Project Name: Evraz Oregon Steel

Aqueous LCS Source: **ALS MIXED** Solid LCS Source:

Analyte	Aqueous (ug/L)			Solid (mg/kg)					
	True	Found	%R	True	Found	C	Limits	%R	
Arsenic	50	48.7	97.4						
Cadmium	25	25.1	100.4						
Calcium	12500	12400	99.2						
Lead	50	49.7	99.4						
Magnesium	12500	13000	104.0						
Manganese	25	24.3	97.2						
Nickel	25	24.2	96.8						
Potassium	12500	12900	103.2						
Sodium	12500	12900	103.2						

Metals

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ICP SERIAL DILUTIONS

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Units: UG/L

Project Name: Evraz Oregon Steel

Sample Name: GW2015011901L

Lab Code: K1500604-001L

Analyte	Initial Sample Result (I) C	Serial Dilution Result (S) C	% Differ- ence	Q	M
Arsenic	4.69	4.95	6		MS
Cadmium	0.019 J	0.025 U	100.0		MS
Calcium	31640.0	30890.0	2.4		P
Lead	0.026	0.047 J	81		MS
Magnesium	22530.0	21595.0	4.2		P
Manganese	1482.917	1594.323	8		MS
Nickel	94.28	99.89	6		MS
Potassium	1317.0	1189.0	9.7		P
Sodium	15260.0	15215.0	0.3		P

Metals**- 10 -****DETECTION LIMITS****Client:** Integral Consulting, Incorporate **Service Request:** K1500604**Project No.:** C1144-0204**Project Name:** Evraz Oregon Steel**ICP/ICP-MS ID #:****GFAA ID #:****AA ID #:**

Analyte	Wave-length (nm)	Back-ground	MRL ug/L	MDL ug/L	M
Calcium	393.3		20.0	0.9	P
Magnesium	279.5		5.0	0.3	P
Potassium	766.5		200.0	60.0	P
Sodium	589.5		200.0	20.0	P

Comments:

Metals
- 10 -

DETECTION LIMITS

Client: Integral Consulting, Incorporate Service Request: K1500604
Project No.: C1144-0204
Project Name: Evraz Oregon Steel

ICP/ICP-MS ID #: K-ICP-MS-03
GFAA ID #: AA ID #:

Analyte	Isotope	Back-ground	MRL ug/L	MDL ug/L	M
Arsenic	75		0.5	0.1	MS
Cadmium	111		0.020	0.005	MS
Lead	208		0.020	0.005	MS
Manganese	55		0.100	0.006	MS
Nickel	60		0.20	0.02	MS

Comments: _____

Metals

- 11A -

ICP INTERELEMENT CORRECTION FACTORS

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

ICP ID Number: K-ICP-AES-03

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Al	Ca	Fe	Mg	B
Aluminum	394.401	0.0000000	0.0000870	0.0000000	0.0000000	0.0000000
Antimony	217.581	0.0000000	0.0000000	-0.0007390	0.0000000	0.0000000
Arsenic	189.042	0.0000240	0.0000000	0.0000000	0.0000000	0.0000000
Barium	455.403	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	234.861	0.0000000	0.0000000	0.0000090	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	-0.0006460	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000770	0.0000000	0.0000000
Calcium	393.366	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	327.396	0.0000000	0.0000150	0.0000000	0.0000000	0.0000000
Iron	259.94	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	-0.0000790	0.0000000	0.0000000	0.0000000	0.0000000
Lithium	670.784	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	285.213	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000120	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	214.914	-0.0007930	0.0000000	0.0007140	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.0	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silicon	251.611	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	589.592	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	407.771	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.856	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	336.121	0.0000000	0.0000110	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Comments:

Metals

- 11A -

ICP INTERELEMENT CORRECTION FACTORS

Client: Integral Consulting, Incorporate Service Request: K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

ICP ID Number: K-ICP-AES-03

Zinc	213.856	0.0000000	0.0000000	0.0001300	0.0000000	0.0000000
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Comments:

Metals

- 11B -

ICP INTERELEMENT CORRECTION FACTORS

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

ICP ID Number: K-ICP-AES-03

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Ba	Cd	Co	Cr	Cu
Aluminum	394.401	0.0000000	0.0000000	0.0000000	0.0001460	0.0000000
Antimony	217.581	0.0000000	0.0000000	0.0000000	0.0000000	-0.0011120
Arsenic	189.042	0.0000000	0.0000000	0.0000000	0.0006290	0.0000000
Barium	455.403	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	234.861	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0033630	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	-0.0000230	0.0000350	0.0000000
Calcium	393.366	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	-0.0001050	0.0000000	0.0000000	0.0000000
Cobalt	228.616	-0.0006470	0.0000000	0.0000000	0.0001570	0.0000000
Copper	327.396	0.0000000	0.0000000	0.0002630	0.0000000	0.0000000
Iron	259.94	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0003030
Lithium	670.784	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	285.213	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0001480	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0002060	0.0000000	0.0000000
Phosphorus	214.914	0.0000000	-0.0014450	0.0000000	0.0000000	0.0042120
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.0	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silicon	251.611	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	589.592	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	407.771	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.856	0.0000000	0.0000000	0.0009280	0.0002900	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	336.121	0.0000000	0.0000000	0.0000300	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	-0.0061560	-0.0000460

Comments:

Metals

- 11B -

ICP INTERELEMENT CORRECTION FACTORS

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

ICP ID Number: K-ICP-AES-03

Zinc	213.856	0.0000000	0.0000000	0.0000000	0.0000000	0.0009290
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Comments:

Metals

- 11B -

ICP INTERELEMENT CORRECTION FACTORS

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

ICP ID Number: K-ICP-AES-03

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Mn	Mo	Ni	Sb	Si
Aluminum	394.401	0.0000000	0.0003130	0.0000276	0.0000000	0.0000000
Antimony	217.581	-0.0007900	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	-0.0002450	0.0018300	0.0000000	0.0000000	0.0000000
Barium	455.403	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	234.861	-0.0000590	-0.0003920	-0.0000180	0.0000000	0.0000000
Boron	249.678	0.0000000	-0.0014770	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	-0.0000340	0.0000000	0.0000000
Calcium	393.366	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0002530	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	-0.0015320	0.0001120	0.0000000	-0.0000080
Copper	327.396	0.0000000	-0.0002580	0.0000000	0.0000000	0.0000000
Iron	259.94	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	-0.0007330	0.0002150	0.0000000	0.0001390
Lithium	670.784	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	285.213	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	-0.0003470	0.0000110
Phosphorus	214.914	-0.0006770	0.0092840	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.0	0.0004240	0.0000000	0.0000000	0.0000000	0.0000000
Silicon	251.611	0.0000000	0.0091950	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0001450	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	589.592	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	407.771	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.856	-0.0006420	0.0000000	0.0000000	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	336.121	0.0000000	0.0000000	0.0001020	0.0000000	0.0000000
Vanadium	292.402	-0.0009140	-0.0000960	0.0000000	0.0000000	0.0000000

Comments:

Metals

- 11B -

ICP INTERELEMENT CORRECTION FACTORS

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

ICP ID Number: K-ICP-AES-03

Zinc	213.856	0.0000000	-0.0001360	0.0060110	0.0000000	0.0000000
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Comments:

Metals

- 11B -

ICP INTERELEMENT CORRECTION FACTORS

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

ICP ID Number: K-ICP-AES-03

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Ti	V			
Aluminum	394.401	0.0000000	0.0000000			
Antimony	217.581	0.0000000	0.0000000			
Arsenic	189.042	0.0000000	0.0000000			
Barium	455.403	0.0000000	0.0000000			
Beryllium	234.861	0.0000000	0.0000000			
Boron	249.678	0.0000000	0.0000000			
Cadmium	226.502	0.0000000	0.0000000			
Calcium	393.366	0.0000000	0.0000000			
Chromium	267.716	0.0000000	0.0000000			
Cobalt	228.616	0.0026270	0.0000000			
Copper	327.396	0.0000000	0.0000000			
Iron	259.94	0.0000000	0.0000000			
Lead	220.353	0.0000000	0.0000000			
Lithium	670.784	0.0000000	0.0000000			
Magnesium	285.213	0.0000000	0.0000000			
Manganese	257.61	0.0000000	0.0000000			
Molybdenum	202.03	0.0000000	0.0000000			
Nickel	231.604	0.0000000	0.0000000			
Phosphorus	214.914	0.0000000	0.0000000			
Potassium	766.491	0.0000000	0.0000000			
Selenium	196.0	0.0000000	0.0000000			
Silicon	251.611	0.0000000	0.0000000			
Silver	328.068	0.0000000	0.0000000			
Sodium	589.592	0.0000000	0.0000000			
Strontium	407.771	0.0000000	0.0000000			
Thallium	190.856	0.0000000	0.0000000			
Tin	189.989	0.0000000	0.0000000			
Titanium	336.121	0.0000000	0.0000000			
Vanadium	292.402	0.0005410	0.0000000			

Comments:

Metals

- 11B -

ICP INTERELEMENT CORRECTION FACTORS

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

ICP ID Number: K-ICP-AES-03

Zinc	213.856	-0.0005770	0.0000000			
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Comments:

Metals
 -12-
 ICP LINEAR RANGES (QUARTERLY)

Client: Integral Consulting, Incorporate Service Request: K1500604
 Project No.: C1144-0204
 Project Name: Evraz Oregon Steel

ICP ID Number: K-ICP-AES-03

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
Calcium	15.000	900000	6010C
Magnesium	15.000	90000	6010C
Potassium	15.000	900000	6010C
Sodium	15.000	900000	6010C

Comments:

Metals
 -12-
 ICP LINEAR RANGES (QUARTERLY)

Client: Integral Consulting, Incorporate Service Request: K1500604
 Project No.: C1144-0204
 Project Name: Evraz Oregon Steel

ICP ID Number: K-ICP-MS-03

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
Arsenic	15.000	2000	6020A
Cadmium	15.000	2000	6020A
Lead	15.000	2000	6020A
Manganese	15.000	2000	6020A
Nickel	15.000	2000	6020A

Comments:

Metals
-13-
PREPARATION LOG

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

Method: P

Sample ID	Preparation Date	Initial Volume	Final Volume(mL)
K1500604-001	01/22/15	50.0	50.0
K1500604-001D	01/22/15	50.0	50.0
K1500604-001S	01/22/15	50.0	50.0
K1500604-002	01/22/15	50.0	50.0
K1500604-003	01/22/15	50.0	50.0
K1500604-004	01/22/15	50.0	50.0
K1500604-005	01/22/15	50.0	50.0
K1500604-006	01/22/15	50.0	50.0
K1500604-007	01/22/15	50.0	50.0
K1500604-008	01/22/15	50.0	50.0
K1500604-MB	01/22/15	50.0	50.0
LCSW	01/22/15	50.0	50.0

Metals
-13-
PREPARATION LOG

Client: Integral Consulting, Incorporate **Service Request:** K1500604

Project No.: C1144-0204

Project Name: Evraz Oregon Steel

Method: MS

Sample ID	Preparation Date	Initial Volume	Final Volume(mL)
K1500604-001	01/22/15	50.0	50.0
K1500604-001D	01/22/15	50.0	50.0
K1500604-001DISS	01/22/15	50.0	50.0
K1500604-001S	01/22/15	50.0	50.0
K1500604-002	01/22/15	50.0	50.0
K1500604-002DISS	01/22/15	50.0	50.0
K1500604-003	01/22/15	50.0	50.0
K1500604-003DISS	01/22/15	50.0	50.0
K1500604-004	01/22/15	50.0	50.0
K1500604-004DISS	01/22/15	50.0	50.0
K1500604-005	01/22/15	50.0	50.0
K1500604-005DISS	01/22/15	50.0	50.0
K1500604-006	01/22/15	50.0	50.0
K1500604-006DISS	01/22/15	50.0	50.0
K1500604-007	01/22/15	50.0	50.0
K1500604-007DISS	01/22/15	50.0	50.0
K1500604-008	01/22/15	50.0	50.0
K1500604-008DISS	01/22/15	50.0	50.0
K1500604-MB	01/22/15	50.0	50.0
LCSW	01/22/15	50.0	50.0

Metals

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ANALYSIS RUN LOG

Client: Integral Consulting, Incorporate

Service Request: K1500604

Project No.: C1144-0204

Run Number: 012315AICP03

Project Name: Evraz Oregon Steel

Instrument ID Number: K-ICP-AES-03

Method: P

Start Date: 01/23/15

End Date: 01/23/15

Sample No.	D/F	Time	% R	Analytes																					
				A L	S B	A S	B A	B E	C D	C A	C R	C O	C U	F E	P B	M G	M N	H G	N I	K S	S E	A G	N A	T L	V N
BLK	1.0	08:29								X						X				X			X		
STD A	1.0	08:32								X						X									
STD B	1.0	08:34								X						X				X			X		
ICV1	1.0	08:37								X						X									
ICV1	1.0	08:39								X						X				X			X		
ICB1	1.0	08:42								X						X				X			X		
LLICV1	1.0	08:44								X						X				X			X		
ZZZZZZ	1.0	08:47																							
ZZZZZZ	1.0	08:49																							
CCV1	1.0	08:53								X						X				X			X		
CCV1	1.0	08:58								X						X									
CCB1	1.0	09:09								X						X				X			X		
ICSA	1.0	09:12								X						X				X			X		
ICSAB	1.0	09:14								X						X				X			X		
ZZZZZZ	1.0	09:19																							
K1500604-MB	1.0	09:39								X						X				X			X		
LCSW	1.0	09:42								X						X				X			X		
K1500604-001	1.0	09:44								X						X				X			X		
K1500604-001L	5.0	09:46								X						X				X			X		
K1500604-001D	1.0	09:49								X						X				X			X		
K1500604-001S	1.0	09:51								X						X				X			X		
K1500604-001A	1.0	09:54								X						X				X			X		
K1500604-002	1.0	09:56								X						X				X			X		
K1500604-003	1.0	09:58								X						X				X			X		
CCV2	1.0	10:01								X						X				X			X		
CCV2	1.0	10:04								X						X									
CCB2	1.0	10:06								X						X				X			X		
K1500604-004	1.0	10:08								X						X				X			X		
K1500604-005	1.0	10:11								X						X				X			X		
K1500604-006	1.0	10:13								X						X				X			X		
K1500604-007	1.0	10:16								X						X				X			X		
K1500604-008	1.0	10:18								X						X				X			X		

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Metals

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ANALYSIS RUN LOG

Client: Integral Consulting, Incorporate

Service Request: K1500604

Project No.: C1144-0204

Run Number: 012315AICP03

Project Name: Evraz Oregon Steel

Instrument ID Number: K-ICP-AES-03

Method: P

Start Date: 01/23/15

End Date: 01/23/15

Sample No.	D/F	Time	% R	Analytes																							
				A L	S B	A S	B A	B E	C D	C A	C R	C O	C U	F E	P B	M G	M N	H G	N I	K E	S G	A A	N L	T V	Z N	C N	
ZZZZZZ	1.0	10:21																									
ZZZZZZ	1.0	10:23																									
ZZZZZZ	1.0	10:25																									
ZZZZZZ	1.0	10:28																									
ZZZZZZ	1.0	10:30																									
CCV3	1.0	10:32							X					X			X			X							
CCV3	1.0	10:35							X					X													
CCB3	1.0	10:37							X					X			X				X						
LLCCV1	1.0	11:00							X					X			X				X						

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Metals

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ANALYSIS RUN LOG

Client: Integral Consulting, Incorporate

Service Request: K1500604

Project No.: C1144-0204

Run Number: 012715AMS03

Project Name: Evraz Oregon Steel

Instrument ID Number: K-ICP-MS-03

Method: MS

Start Date: 01/27/15

End Date: 01/27/15

Sample No.	D/F	Time	% R	Analytes																					
				A L	S B	A S	B A	B E	C D	C A	C R	C O	C U	F E	P B	M G	M N	H G	N I	K S	S E	A G	N A	T L	V N
Cal. Blk	1.0	07:40				X			X						X		X		X						
Cal. Stn	1.0	07:43				X			X						X		X		X						
ICV1	1.0	07:47				X			X						X		X		X						
CCV1	1.0	07:51				X			X						X		X		X						
ICB1	1.0	07:55				X			X						X		X		X						
CCB1	1.0	07:58				X			X						X		X		X						
LLICVW1	1.0	08:02				X			X						X		X		X						
ICS-A1	1.0	08:05				X			X						X		X		X						
ICS-AB1	1.0	08:09				X			X						X		X		X						
ZZZZZZ	1.0	08:13																							
ZZZZZZ	1.0	08:16																							
ZZZZZZ	1.0	08:21																							
ZZZZZZ	1.0	08:25																							
ZZZZZZ	1.0	08:28																							
ZZZZZZ	1.0	08:32																							
ZZZZZZ	5.0	08:36																							
ZZZZZZ	1.0	08:40																							
ZZZZZZ	1.0	08:44																							
ZZZZZZ	1.0	08:49																							
CCV2	1.0	08:53				X			X						X		X		X						
CCB2	1.0	08:57				X			X						X		X		X						
LLCCVW1	1.0	09:00				X			X						X		X		X						
ZZZZZZ	1.0	09:04																							
ZZZZZZ	1.0	09:08																							
ZZZZZZ	1.0	09:12																							
ZZZZZZ	1.0	09:16																							
ZZZZZZ	1.0	09:20																							
ZZZZZZ	5.0	09:24																							
ZZZZZZ	1.0	09:27																							
ZZZZZZ	1.0	09:31																							
K1500604-MB	1.0	09:36				X			X						X		X		X						
LCSW	1.0	09:39				X			X						X		X		X						

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Metals

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ANALYSIS RUN LOG

Client: Integral Consulting, Incorporate

Service Request: K1500604

Project No.: C1144-0204

Run Number: 012715AMS03

Project Name: Evraz Oregon Steel

Instrument ID Number: K-ICP-MS-03

Method: MS

Start Date: 01/27/15

End Date: 01/27/15

Sample No.	D/F	Time	% R	Analytes																					
				A L	S B	A S	B A	B E	C D	C A	C R	C O	C U	F E	P B	M G	M N	H G	N I	K S	S E	A G	N A	T L	V N
CCV3	1.0	09:44				X			X						X		X		X						
CCB3	1.0	09:48				X			X						X		X		X						
K1500604-001	1.0	09:51				X									X		X		X						
K1500604-001D	1.0	09:55				X									X		X		X						
K1500604-001L	5.0	09:59				X									X		X		X						
K1500604-001A	1.0	10:02				X									X		X		X						
K1500604-001S	1.0	10:06				X									X		X		X						
K1500604-002	1.0	10:11				X									X		X		X						
K1500604-003	1.0	10:15				X			X						X				X						
K1500604-004	1.0	10:18				X									X				X						
K1500604-005	1.0	10:22				X			X						X		X		X						
K1500604-006	1.0	10:26				X			X						X		X		X						
CCV4	1.0	10:32				X			X						X		X		X						
CCB4	1.0	10:37				X			X						X		X		X						
LLCCVW2	1.0	10:45				X			X						X				X						
LLCCVW2	1.0	10:49															X								
K1500604-007	1.0	10:53				X			X						X				X						
K1500604-008	1.0	11:03				X			X						X		X		X						
K1500604-001DISS	1.0	11:06				X			X						X		X		X						
K1500604-002DISS	1.0	11:11				X									X		X		X						
K1500604-003DISS	1.0	11:16				X			X						X				X						
K1500604-004DISS	1.0	11:22				X									X				X						
K1500604-005DISS	1.0	11:26				X			X						X		X		X						
K1500604-006DISS	1.0	11:30				X			X						X		X		X						
K1500604-007DISS	1.0	11:33				X			X						X				X						
K1500604-008DISS	1.0	11:44				X			X						X		X		X						
CCV5	1.0	11:48				X			X						X		X		X						
CCB5	1.0	11:55				X			X						X		X		X						
K1500604-003	50.0	11:59															X								
K1500604-004	50.0	12:03															X								
K1500604-007	50.0	12:07															X								
K1500604-003DISS	50.0	12:11															X								

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Metals
 - 14 -

ANALYSIS RUN LOG

Client: Integral Consulting, Incorporate Service Request: K1500604
 Project No.: C1144-0204 Run Number: 012715AMS03
 Project Name: Evraz Oregon Steel

Instrument ID Number: K-ICP-MS-03 Method: MS
 Start Date: 01/27/15 End Date: 01/27/15

Sample No.	D/F	Time	% R	Analytes																					
				A L	S B	A S	B A	B E	C D	C A	C R	C O	C U	F E	P B	M G	M N	H G	N I	K	S E	A G	N A	T L	V
K1500604-004DISS	50.0	12:14															X								
K1500604-007DISS	50.0	12:18															X								
CCV6	1.0	12:22				X			X					X		X		X							
CCB6	1.0	12:27				X			X					X		X		X							
ZZZZZZ	1.0	12:30																							
LLCCVW3	1.0	12:34				X			X					X				X							
LLCCVW3	1.0	12:47														X									

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Metals

- 14 -

ANALYSIS RUN LOG

Client: Integral Consulting, Incorporate

Service Request: K1500604

Project No.: C1144-0204

Run Number: 012915CMS03

Project Name: Evraz Oregon Steel

Instrument ID Number: K-ICP-MS-03

Method: MS

Start Date: 01/29/15

End Date: 01/29/15

Sample No.	D/F	Time	% R	Analytes																											
				A L	S B	A S	B A	B E	C D	C A	C R	C O	C U	F E	P B	M G	M N	H G	N I	K E	S G	A G	N A	T L	V	Z N	C N				
Cal. Blk	1.0	10:00							X																						
Cal. Stn	1.0	10:04							X																						
ICV2	1.0	10:08							X																						
CCV1	1.0	10:14							X																						
ICB2	1.0	10:24							X																						
CCB1	1.0	10:28							X																						
LLICVW2	1.0	10:32							X																						
ICS-A2	1.0	10:36							X																						
ICS-AB2	1.0	10:40							X																						
K1500604-001	1.0	10:46							X																						
K1500604-001D	1.0	10:50							X																						
K1500604-001L	5.0	10:54							X																						
K1500604-001A	1.0	10:58							X																						
K1500604-001S	1.0	11:02							X																						
K1500604-002	1.0	11:08							X																						
K1500604-004	1.0	11:12							X																						
K1500604-002DISS	1.0	11:16							X																						
K1500604-004DISS	1.0	11:21							X																						
ZZZZZZ	1.0	11:25																													
CCV2	1.0	11:29							X																						
CCB2	1.0	11:35							X																						
LLCCVW1	1.0	11:39							X																						

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Metals

15-IN

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Lab Name: ALS Group USA, Corp.Contract: C1144-0204Lab Code: ALSK

Case No.: _____

NRAS No.: _____

SDG NO.: K1500604ICP-MS Instrument ID: K-ICP-MS-03Start Date: 01/27/2015End Date: 01/27/2015

Sample No.	Client ID	Time	Internal Standards %RI For:									
			Element	Q	Element	Q	Element	Q	Element	Q	Element	Q
Cal. Blk	Cal. Blk	0740	100		100		100		100			
Cal. Stn	Cal. Stn	0743	101		103		102		103		102	
ICV1	ICV1	0747	101		102		101		103		102	
CCV1	CCV1	0751	100		100		101		101		101	
ICB1	ICB1	0755	98		100		100		100		101	
CCB1	CCB1	0758	98		100		100		100		101	
LLICVW1	LLICVW1	0802	97		98		98		98		100	
ICS-A1	ICSA	0805	95		93		91		93		95	
ICS-AB1	ICSAB	0809	91		90		88		92		93	
ZZZZZZ	ZZZZZZ	0813										
ZZZZZZ	ZZZZZZ	0816										
ZZZZZZ	ZZZZZZ	0821										
ZZZZZZ	ZZZZZZ	0825										
ZZZZZZ	ZZZZZZ	0828										
ZZZZZZ	ZZZZZZ	0832										
ZZZZZZ	ZZZZZZ	0836										
ZZZZZZ	ZZZZZZ	0840										
ZZZZZZ	ZZZZZZ	0844										
ZZZZZZ	ZZZZZZ	0849										
CCV2	CCV2	0853	78		84		88		91		99	
CCB2	CCB2	0857	77		82		86		89		97	
LLCCVW1	LLCCVW1	0900	78		83		87		89		97	
ZZZZZZ	ZZZZZZ	0904										
ZZZZZZ	ZZZZZZ	0908										
ZZZZZZ	ZZZZZZ	0912										
ZZZZZZ	ZZZZZZ	0916										
ZZZZZZ	ZZZZZZ	0920										
ZZZZZZ	ZZZZZZ	0924										
ZZZZZZ	ZZZZZZ	0927										
ZZZZZZ	ZZZZZZ	0931										
K1500604-MB	Method Blank	0936	85		88		91		91		96	
LCSW	Lab Control	0939	88		90		92		93		98	
CCV3	CCV3	0944	86		90		92		93		97	
CCB3	CCB3	0948	84		87		89		90		95	
K1500604-001	GW2015011901	0951	99		87		88		89		95	
K1500604-001D	GW2015011901D	0955	98		87		87		90		95	
K1500604-001L	GW2015011901L	0959	88		88		90		91		96	
K1500604-001A	GW2015011901A	1002	99		88		88		91		96	
K1500604-001S	GW2015011901S	1006	98		86		87		89		95	
K1500604-002	GW2015011902	1011	91		85		86		88		95	
K1500604-003	GW2015011903	1015	93		85		85		87		93	
K1500604-004	GW2015012004	1018	92		85		85		87		93	
K1500604-005	GW2015012005	1022	97		86		87		89		94	
K1500604-006	GW2015012006	1026	97		87		87		90		95	

Metals

15-IN

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Lab Name: ALS Group USA, Corp. Contract: C1144-0204
 Lab Code: ALSK Case No.: _____ NRAS No.: _____ SDG NO.: K1500604
 ICP-MS Instrument ID: K-ICP-MS-03 Start Date: 01/27/2015 End Date: 01/27/2015

Sample No.	Client ID	Time	Internal Standards %RI For:									
			Element	Q	Element	Q	Element	Q	Element	Q	Element	Q
CCV4	CCV4	1032	85		89		91		93		96	
CCB4	CCB4	1037	90		92		94		94		97	
LLCCVW2	LLCCVW2	1045	91		93		94		94		97	
LLCCVW2	LLCCVW2	1049	89		92		94		94		97	
K1500604-007	GW2015012007	1053	104		92		91		94		97	
K1500604-008	ERB2015012001	1103	91		95		97		99		101	
K1500604-001DISS	GW2015011901	1106	102		92		94		97		100	
K1500604-002DISS	GW2015011902	1111	98		92		94		98		102	
K1500604-003DISS	GW2015011903	1116	103		95		94		98		100	
K1500604-004DISS	GW2015012004	1122	99		92		92		95		99	
K1500604-005DISS	GW2015012005	1126	104		93		94		97		101	
K1500604-006DISS	GW2015012006	1130	102		92		94		97		100	
K1500604-007DISS	GW2015012007	1133	102		92		93		96		100	
K1500604-008DISS	ERB2015012001	1144	90		93		96		97		99	
CCV5	CCV5	1148	94		96		98		100		101	
CCB5	CCB5	1155	89		93		96		97		99	
K1500604-003	GW2015011903	1159	91		95		98		99		101	
K1500604-004	GW2015012004	1203	93		95		99		100		102	
K1500604-007	GW2015012007	1207	94		96		99		100		102	
K1500604-003DISS	GW2015011903	1211	93		95		98		100		102	
K1500604-004DISS	GW2015012004	1214	93		96		99		100		102	
K1500604-007DISS	GW2015012007	1218	94		96		99		101		102	
CCV6	CCV6	1222	92		96		98		100		102	
CCB6	CCB6	1227	94		96		98		99		101	
ZZZZZZ	ZZZZZZ	1230										
LLCCVW3	LLCCVW3	1234	93		95		98		99		101	
LLCCVW3	LLCCVW3	1247	88		91		93		96		100	

Metals

15-IN

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Lab Name: ALS Group USA, Corp. Contract: C1144-0204Lab Code: ALSK Case No.: _____ NRAS No.: _____ SDG NO.: K1500604ICP-MS Instrument ID: K-ICP-MS-03 Start Date: 01/29/2015 End Date: 01/29/2015

Sample No.	Client ID	Time	Internal Standards %RI For:											
			Element	Q	Element	Q	Element	Q	Element	Q	Element	Q	Element	Q
Cal. Blk	Cal. Blk	1000	100											
Cal. Stn	Cal. Stn	1004	103											
ICV2	ICV1	1008	106											
CCV1	CCV1	1014	104											
ICB2	ICB1	1024	99											
CCB1	CCB1	1028	102											
LLICVW2	LLICVW2	1032	104											
ICS-A2	ICSA	1036	103											
ICS-AB2	ICSAB	1040	104											
K1500604-001	GW2015011901	1046	104											
K1500604-001D	GW2015011901D	1050	104											
K1500604-001L	GW2015011901L	1054	106											
K1500604-001A	GW2015011901A	1058	105											
K1500604-001S	GW2015011901S	1102	105											
K1500604-002	GW2015011902	1108	102											
K1500604-004	GW2015012004	1112	101											
K1500604-002DISS	GW2015011902	1116	105											
K1500604-004DISS	GW2015012004	1121	103											
ZZZZZZ	ZZZZZZ	1125												
CCV2	CCV2	1129	108											
CCB2	CCB2	1135	96											
LLCCVW1	LLCCVW1	1139	98											

ATTACHMENT D

DATA VALIDATION REPORT

DATA VALIDATION REPORT

Source Control Groundwater Sampling

Prepared for
EVRAZ Oregon Steel
14400 North Rivergate Boulevard
Portland, OR 97203



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February 27, 2015

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ACRONYMS AND ABBREVIATIONS

ALS	ALS Environmental
CCB	continuing calibration blank
COC	chain of custody
DOC	dissolved organic carbon
EPA	U.S. Environmental Protection Agency
MDL	method detection limit
MRL	method reporting limit
QA/QC	quality assurance and quality control
RPD	relative percent difference

1 INTRODUCTION

This report presents the findings of the data validation of eight water samples and associated quality control samples analyzed for total and dissolved metals and for conventional chemistry parameters, and reported in sample delivery group K1500604. The parameters and analytical methods are listed in Table 1-1.

The samples received a Stage 2B validation, which included a review of all laboratory summary forms of quality control results and instrument performance data. The data validation was based upon criteria described in the U.S. Environmental Protection Agency's (EPA) functional guidelines for inorganic data review (USEPA 2010) and the referenced analytical methods.

The quality assurance and quality control (QA/QC) parameters reviewed are discussed in Section 2. All electronic data deliverables were compared to the hardcopy data packages, and 10% of the results were verified. Qualifiers resulting from the validation process were entered into the project database. A reason code indicating the reason for qualification was also entered into the database. The definitions of the data qualifiers used are provided in Table 1-2 and descriptions of the reason codes used are provided in Table 1-3. For example, if a data point were estimated due to laboratory blank contamination, the qualifier "U" and the reason code "LB" would be entered into the database, indicated as U-LB in the discussion of findings in Section 2.

2 FINDINGS

The following sections describe the findings of the data validation.

2.1 PARAMETERS REVIEWED

The QA/QC parameters reviewed for each analytical parameter are discussed below and are listed in Table 2-1.

2.2 SAMPLE RECEIPT AND HOLDING TIMES

Samples were received with complete chain-of-custody (COC) forms and in good condition, with the exception noted below. All analyses were conducted within the holding times in the referenced methods.

The ALS Environmental (ALS) courier did not fill in the "Relinquished By" information on the COC form.

2.3 BLANKS

Laboratory blanks were analyzed as required by the referenced analytical methods. One equipment blank was collected along with the samples. Target analytes were not detected in any of the laboratory or equipment blanks, with the exceptions noted below.

Dissolved Organic Carbon: Dissolved organic carbon (DOC) was detected at a concentration less than the method reporting limit (MRL) in the method blank. The detected DOC result in the equipment blank ERB2015012001 was qualified as not detected (U-LB) and no qualifiers were assigned based on the detection in the equipment blank.

DOC was detected in two continuing calibration blanks (CCBs) at concentrations less than the MRL. DOC results in the associated samples were either not detected or DOC concentrations were greater than the MRL, and no qualifiers were assigned.

Total Alkalinity: Total alkalinity was detected at a concentration less than the MRL in the method blank. Total alkalinity results in the associated samples were greater than the MRL, and no qualifiers were assigned.

Metals: Hardness, calcium, lead, magnesium, and zinc were detected at concentrations less than the MRL in the method blank, and the following actions were taken:

- The hardness, calcium, and zinc concentrations in the associated samples were greater than the MRL, and no qualifiers were assigned.
- Lead and magnesium concentrations less than the MRL in the associated samples were qualified as not detected (U-LB).

Hardness, total calcium, total manganese, and dissolved manganese were detected at concentrations above the MRL in equipment blank ERB2015012001. Additionally, total lead, total nickel, and dissolved nickel were detected at concentrations less than the MRL. The following actions were taken:

- Hardness, total calcium, total manganese, and dissolved manganese concentrations were greater than 10 times the equipment blank concentration in the associated samples, and no qualifiers were assigned.
- Total nickel and dissolved nickel concentrations were greater than the MRL in the associated samples, and no qualifiers were assigned.
- Total lead concentrations less the MRL in the associated samples were qualified as not detected (U-FB).

Cadmium, lead, magnesium, manganese, and nickel were detected at concentrations less than the MRL in the initial calibration blanks, and the following actions were taken:

- Total and dissolved manganese concentrations in the associated samples were greater than the MRL and no qualifiers were assigned.
- Total and dissolved cadmium, lead, magnesium, and nickel concentrations less the MRL in the associated samples were qualified as not detected (U-LB).

Calcium was reported as a negative concentration with an absolute value less than the MRL in CCB1. The calcium concentrations were greater than 10 times the MRL in the associated samples, and no qualifiers were assigned.

Magnesium was detected at a concentration less than the MRL in CCB2. Total and dissolved magnesium concentrations less the MRL in the associated samples were qualified as not detected (U-LB).

Cadmium and lead were detected at concentrations less than the MRL in CCB3. Total cadmium and lead concentrations less the MRL in the associated samples were qualified as not detected (U-LB).

Manganese was detected at a concentration less than the MRL in CCB4. Total and dissolved manganese concentrations were greater than the MRL in the associated samples, and no qualifiers were assigned.

Manganese was detected at a concentration less than the MRL in CCB5. Additionally, nickel was reported as negative concentration with absolute values less than the MRL. The following actions were taken:

- Total and dissolved manganese concentrations in the associated samples were greater than the MRL, and no qualifiers were assigned.
- Total and dissolved nickel concentrations less than 10 times the MRL in the associated samples were estimated (J-LB).

2.4 MATRIX SPIKES/MATRIX SPIKE DUPLICATES

Matrix spike analyses were performed at the appropriate frequency of one per analytical batch for metals, chloride, sulfate, and DOC. Matrix spike duplicates were submitted with the chloride and sulfate analyses. The percent recoveries and relative percent differences (RPDs) of all matrix spikes and matrix spike duplicates were generally within the laboratory control limits, with the exceptions noted below.

Metals: The percent recovery value of 200% for manganese in the matrix spike analysis of sample GW2015011901 was greater than the upper control limit of 125%. Because the concentration of manganese in the parent sample was greater than 4 times the amount spiked, the control limits do not apply and no qualifiers were assigned.

2.5 LABORATORY CONTROL SAMPLES

Laboratory control samples were analyzed at the appropriate frequency of one per analytical batch for metals and conventional chemistry parameters. The percent recoveries of all laboratory control samples were within the laboratory control limits.

2.6 DUPLICATES

Laboratory duplicate analyses were performed at the appropriate frequency of one per analytical batch for metals and conventional chemistry parameters. RPDs were within the laboratory control limits.

2.7 FIELD REPLICATES

One field replicate pair was reported (GW2015012005 and GW2015012006). The EPA has not established control limits for field replicates. For this project the target control limit for field replicates is an RPD less than 35% for values greater than 5 times the MRL. For values less than

5 times the MRL, the absolute difference should be less than the MRL. The results were within these control limits.

2.8 SERIAL DILUTIONS

Serial dilution analysis was performed at the appropriate frequency of one per analytical batch for metals. The percent differences for all analytes with initial concentrations greater than 50 times the method detection limit (MDL) met the control limit of 10%.

2.9 REPORTING LIMITS AND METHODOLOGY

The MDLs and MRLs were evaluated against the limits in Table B-1 of the *Work Plan for Additional Groundwater Sampling of Beach and Bank Wells Evraz Oregon Steel* (AECOM 2012). The reported MDLs and MRLs were consistent with the target MDLs and MRLs, with the exceptions noted below.

Conventional Chemistry Parameters: Samples that were analyzed at dilutions are noted below. The MDLs and MRLs were elevated accordingly:

- Samples GW2015011902, GW2015012005, and GW2015012006 were analyzed at 2-fold dilutions, sample GW2015011903 was analyzed at a 5-fold dilution, and samples GW2015011901 and GW2015012004 were analyzed at 20-fold dilutions for high chloride concentrations.
- Sample GW2015011903 was analyzed at a 2-fold dilution and sample GW2015012004 was analyzed at a 4-fold dilution for high DOC concentrations.
- All samples, except sample ERB2015012001, were analyzed at 2-fold dilutions for high sulfate concentrations.

The MDLs and MRLs for alkalinity in all samples were above the target MDL and MRL of 0.6 and 2 µg/L, respectively.

Metals: Samples GW2015011903, GW2015012004, and GW2015012007 were analyzed at 50-fold dilutions because of high manganese concentrations. The MDLs and MRLs were elevated accordingly.

2.10 INITIAL CALIBRATION

Metals, chloride, DOC, and sulfate initial calibration verifications were analyzed at the appropriate frequency and met the acceptance criteria stated in EPA's functional guidelines for inorganic data review (USEPA 2010).

2.11 CONTINUING CALIBRATION VERIFICATION

Metals, chloride, DOC, and sulfate continuing calibration verifications were analyzed at the appropriate frequency and met the acceptance criteria stated in EPA's functional guidelines for inorganic data review (USEPA 2010).

2.12 INTERFERENCE CHECKS

The interference check sample was analyzed at the beginning of each analytical sequence and met the acceptance criteria stated in the EPA's functional guidelines for inorganic data review (USEPA 2010).

2.13 INTERNAL STANDARDS

Internal standards were added to all samples analyzed for metals by Method 6020A. The internal standard relative intensities for all samples met the acceptance criteria stated in EPA's functional guidelines for inorganic data review (USEPA 2010).

3 OVERALL ASSESSMENT

The following sections provide an overall assessment.

3.1 DATA QUALIFICATION

A total of 160 results were reported. A total of 21 results (13%) were qualified; the number of results qualified is summarized by reason in Table 3-1. A summary of all qualified results is presented in Table 3-2.

A number of metals results were qualified as not detected because of results observed in the associated laboratory blanks or equipment blank.

The total and dissolved nickel results in the equipment blank were qualified as estimated because of a low instrument bias observed in the associated laboratory blank.

No results were rejected and completeness was 100%.

3.2 DATA USABILITY

The data meet the criteria set forth in the referenced quality assurance documents, with the exceptions noted above. All results are acceptable for their intended use.

4 REFERENCES

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USEPA. 2010. USEPA Contract Laboratory Program national functional guidelines for inorganic Superfund data review. USEPA-540-R-10-01. January 2010. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation, Washington, DC.

TABLES

Table 1-1. Analytical Parameters and Methods

Laboratory	Analytical Parameter	Analytical Method	Reference
ALS	Alkalinity	SM2320B	APHA et al. (2012)
	Chloride	EPA 300.0	USEPA (1993)
	Dissolved Organic Carbon	EPA 415.1	USEPA (1974)
	Hardness as CaCO ₃	SM2340B	APHA et al. (2012)
	Sulfate	EPA 300.0	USEPA (1993)
	Total and Dissolved Metals	EPA 6010C/6020A	USEPA (2007a)
	Total Suspended Solids	SM2540D	APHA et al. (2012)

Notes:

ALS = ALS Environmental; Kelso, WA

dissolved metals = arsenic, cadmium, lead, manganese, nickel

SM = Standard Method for the Examination of Water and Wastewater

total metals = arsenic, cadmium, calcium, lead, magnesium, manganese, nickel, potassium, sodium

Table 1-2. Definition of Data Qualifiers

Data Qualifier	Definition
U	The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.
UJ	Estimated and not detected. The analyte is considered to be not detected at the reported value, and the associated numerical value is an estimated value.

Table 1-3. Definition of Data Validation Reason Codes

Reason Code	Definition
FB	Field blank
LB	Laboratory blank

Table 2-1. QA/QC Parameters Reviewed

QA/QC Parameters	Analytical Parameter						
	Alkalinity	Chloride	Dissolved Organic Carbon	Hardness as CaCO ₃	Sulfate	Total and Dissolved Metals	Total Suspended Solids
	SM2320B	EPA 300.0	EPA 415.1	SM2340B	EPA 300.0	EPA 6010C /6020A	SM2540D
Sample Receipt and Holding Times	D	D	D	D	D	D	D
Blanks	D	+	Q	D	+	Q	+
MS/MSD	NA	+	+	NA	+	D	NA
LCS	+	+	+	NA	+	+	+
Duplicates	+	+	+	+	+	+	+
Serial Dilutions	NA	NA	NA	NA	NA	+	NA
MRL/MDL & Methodology	D	D	D	+	D	D	+
Initial Calibration Verification	NA	+	+	D	+	+	NA
Continuing Calibration Verification	NA	+	+	D	+	+	NA
Interference Checks	NA	NA	NA	D	NA	+	NA
Internal Standards	NA	NA	NA	D	NA	+	NA

Notes:

+ = All QA/QC criteria met

D = Data are discussed in the report. QA/QC criteria were not met; however no data were qualified.

Q = Data were qualified and are discussed in the report.

LCS = laboratory control sample

MDL = method detection limit

MRL = method reporting limit

MS/MSD = matrix spike/matrix spike duplicate

Metals = arsenic, cadmium, chromium, copper, lead, manganese, zinc

NA = not applicable

QA/QC = quality assurance and quality control

Table 3-1. Summary of Qualified Data Points by Reason

Data Qualification Reason	Number of Data Points Estimated	Number of Data Points Qualified Not Detected	Number of Data Points Rejected
Equipment blank contamination	-	4	-
Method blank contamination	2	21	-

Notes:

- = none

Table 3-2. Summary of Qualified Data

SDG	Sample	Analyte	Result	Method Reporting Limit	Lab Qualifier	DV Qualifier	DV Qualifier Reason	Units
K1500604	GW2015011901	Cadmium	0.019	0.02	J	U	LB	µg/L
K1500604	GW2015011901	Dissolved Cadmium	0.013	0.02	J	U	LB	µg/L
K1500604	GW2015011901	Dissolved Lead	0.009	0.02	J	U	LB	µg/L
K1500604	GW2015011903	Cadmium	0.006	0.02	J	U	LB	µg/L
K1500604	GW2015011903	Lead	0.008	0.02	J	U	LB,FB	µg/L
K1500604	GW2015012004	Cadmium	0.012	0.02	J	U	LB	µg/L
K1500604	GW2015012004	Dissolved Cadmium	0.008	0.02	J	U	LB	µg/L
K1500604	GW2015012005	Cadmium	0.005	0.02	J	U	LB	µg/L
K1500604	GW2015012005	Lead	0.007	0.02	J	U	LB,FB	µg/L
K1500604	GW2015012005	Dissolved Lead	0.005	0.02	J	U	LB	µg/L
K1500604	GW2015012006	Cadmium	0.01	0.02	J	U	LB	µg/L
K1500604	GW2015012006	Lead	0.006	0.02	J	U	LB,FB	µg/L
K1500604	GW2015012007	Cadmium	0.011	0.02	J	U	LB	µg/L
K1500604	GW2015012007	Lead	0.016	0.02	J	U	LB,FB	µg/L
K1500604	GW2015012007	Dissolved Cadmium	0.011	0.02	J	U	LB	µg/L
K1500604	GW2015012007	Dissolved Lead	0.009	0.02	J	U	LB	µg/L
K1500604	ERB2015012001	Lead	0.006	0.02	J	U	LB	µg/L
K1500604	ERB2015012001	Magnesium	2.2	5	J	U	LB	µg/L
K1500604	ERB2015012001	Nickel	0.09	0.2	J	UJ	LB	µg/L
K1500604	ERB2015012001	Dissolved Organic Carbon	0.22	0.5	J	U	LB	mg/L
K1500604	ERB2015012001	Dissolved Nickel	0.05	0.2	J	UJ	LB	µg/L

Notes:

DV = data validation

FB = equipment blank contamination

LB = laboratory blank contamination

SDG = sample delivery group

J = The associated numerical value is an estimated quantity.

U = The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

UJ = Estimated and not detected. The analyte is considered to be not detected at the reported value, and the associated numerical value is an estimate.

ATTACHMENT E

TRANSITION ZONE WATER BY SITE

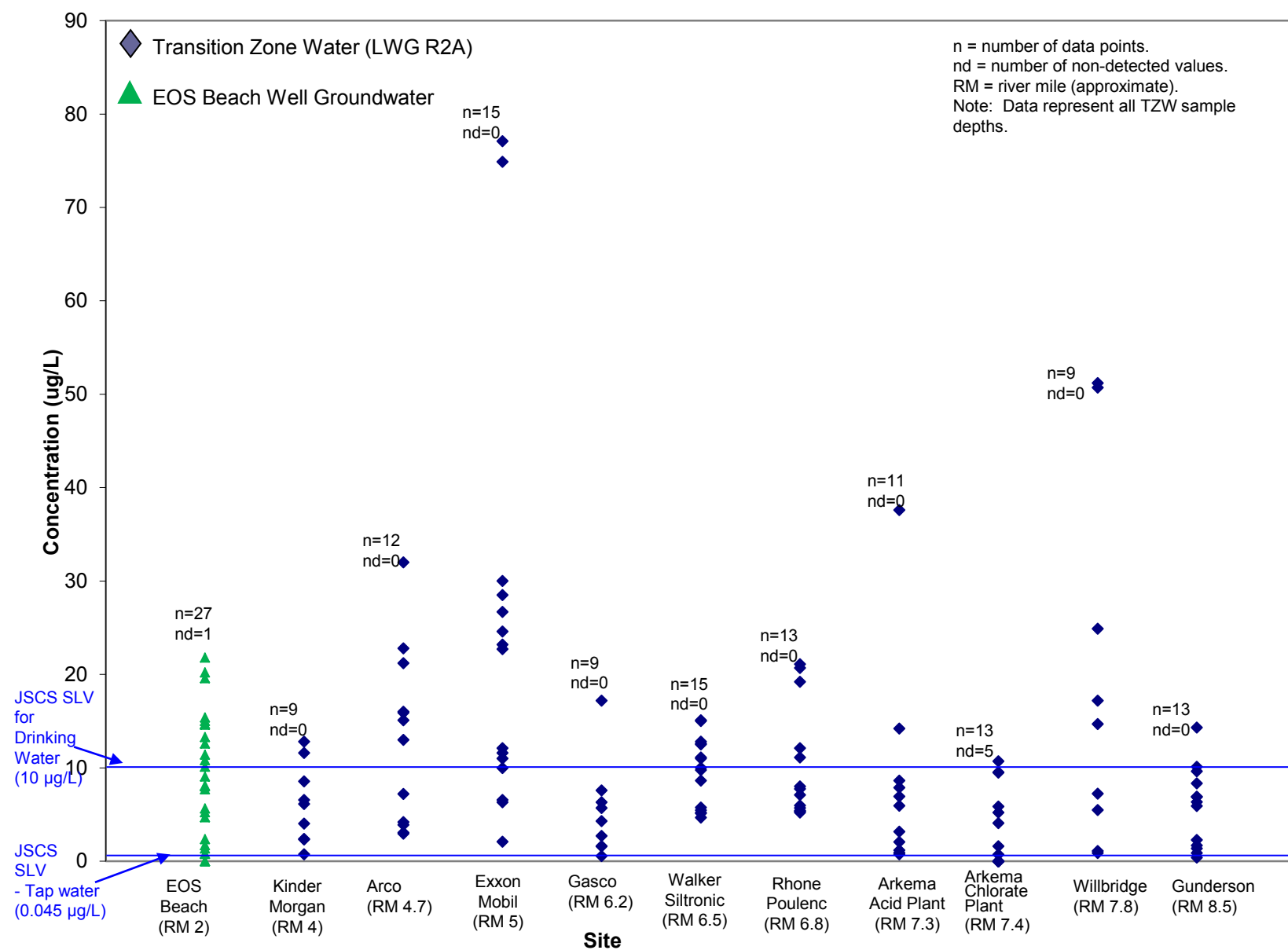


Figure E-1.
 Total Arsenic in LWG Transition Zone Water by Site

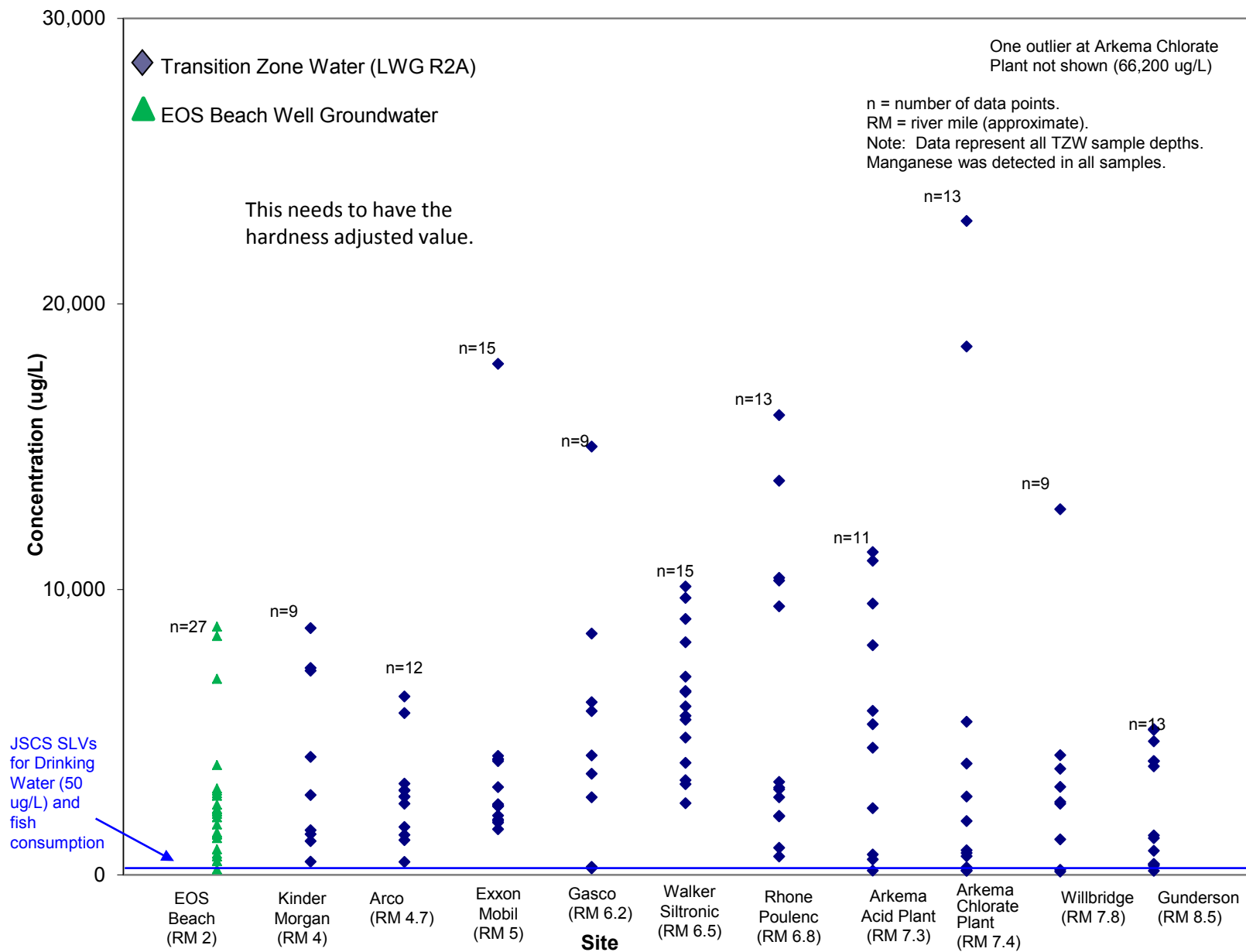


Figure E-2.
 Total Manganese in LWG Transition Zone Water by Site

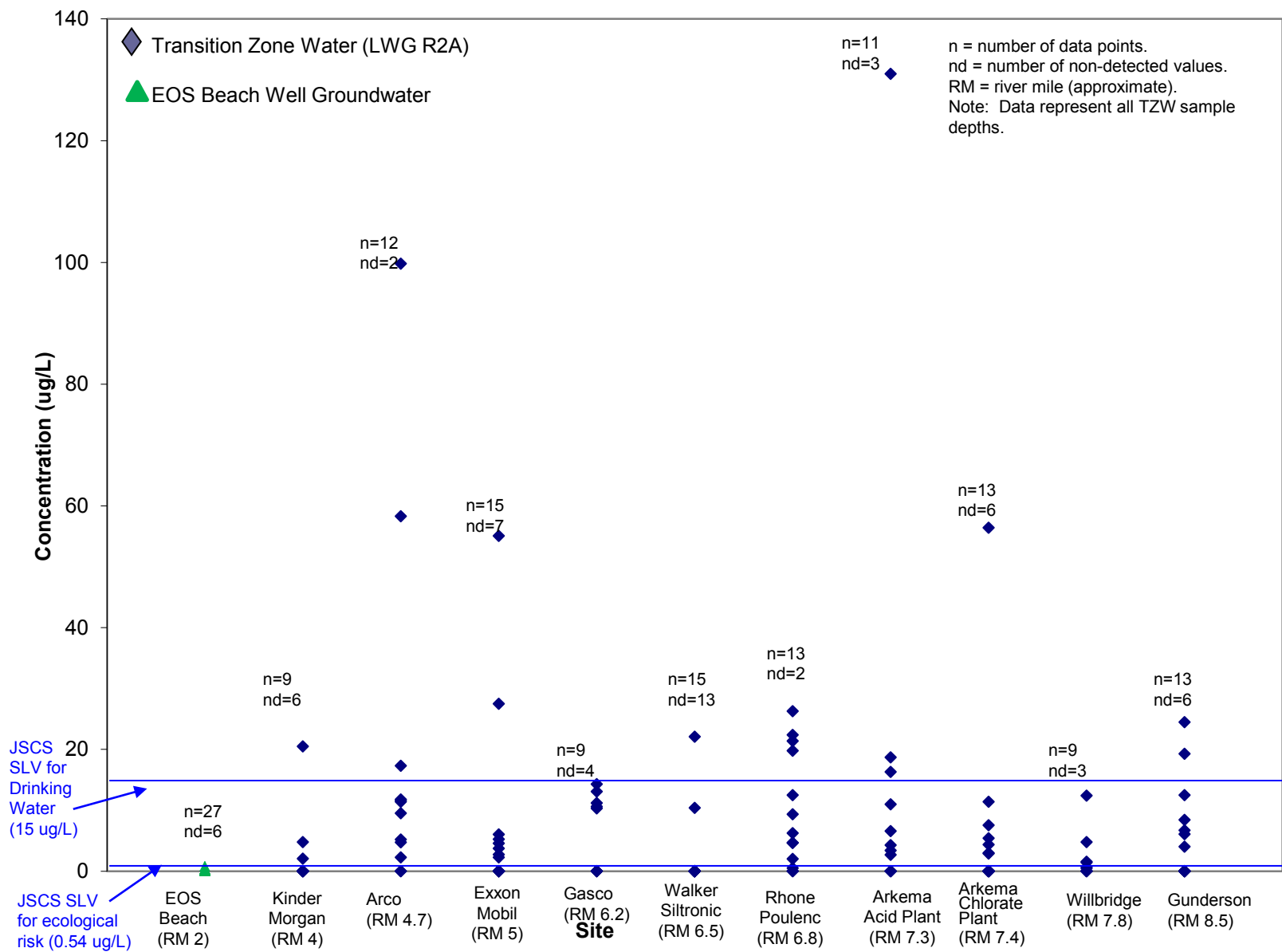


Figure E-3.
Total Lead in LWG Transition Zone Water by Site

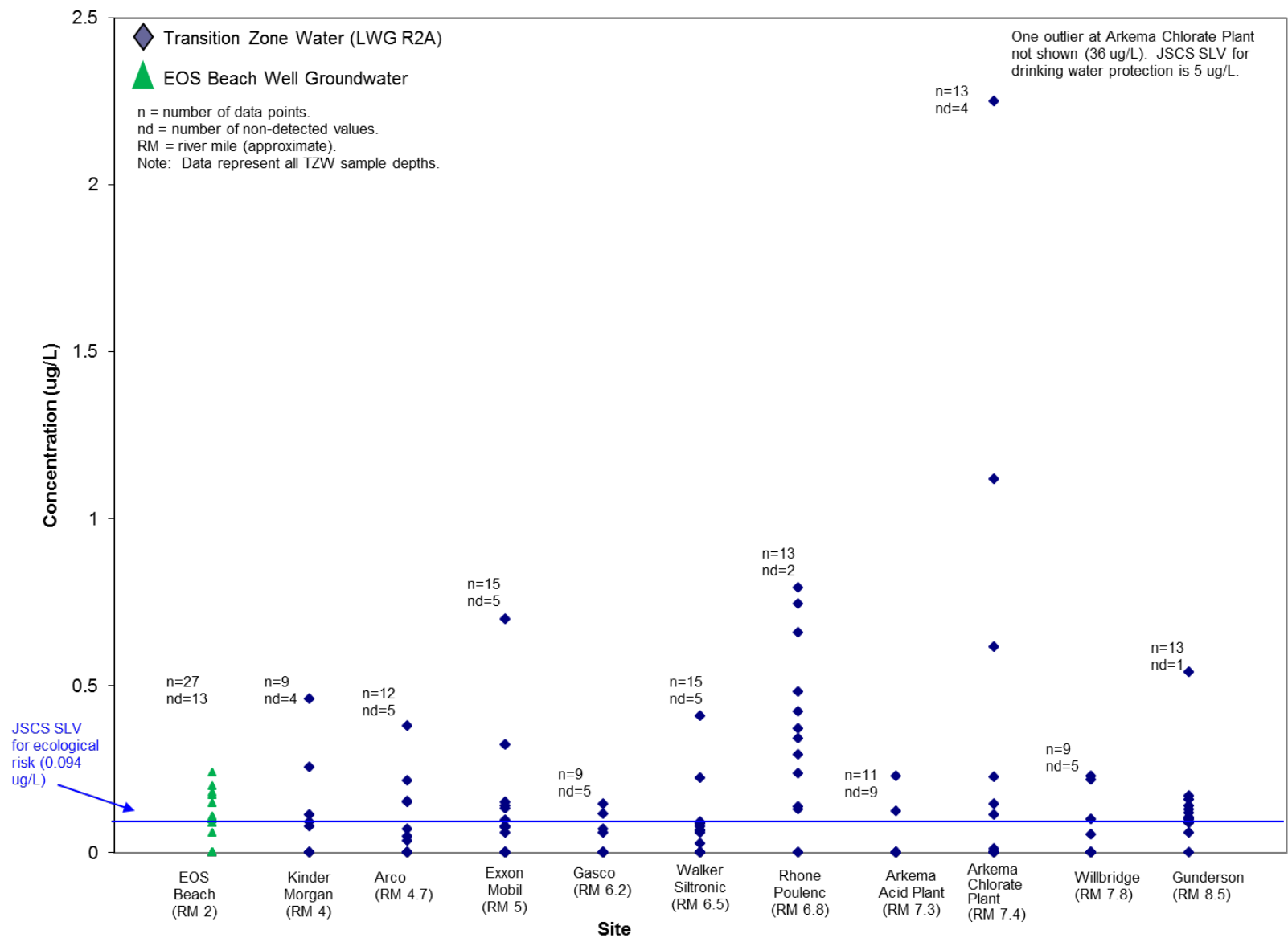


Figure E-4.
Total Cadmium in LWG Transition Zone Water by Site

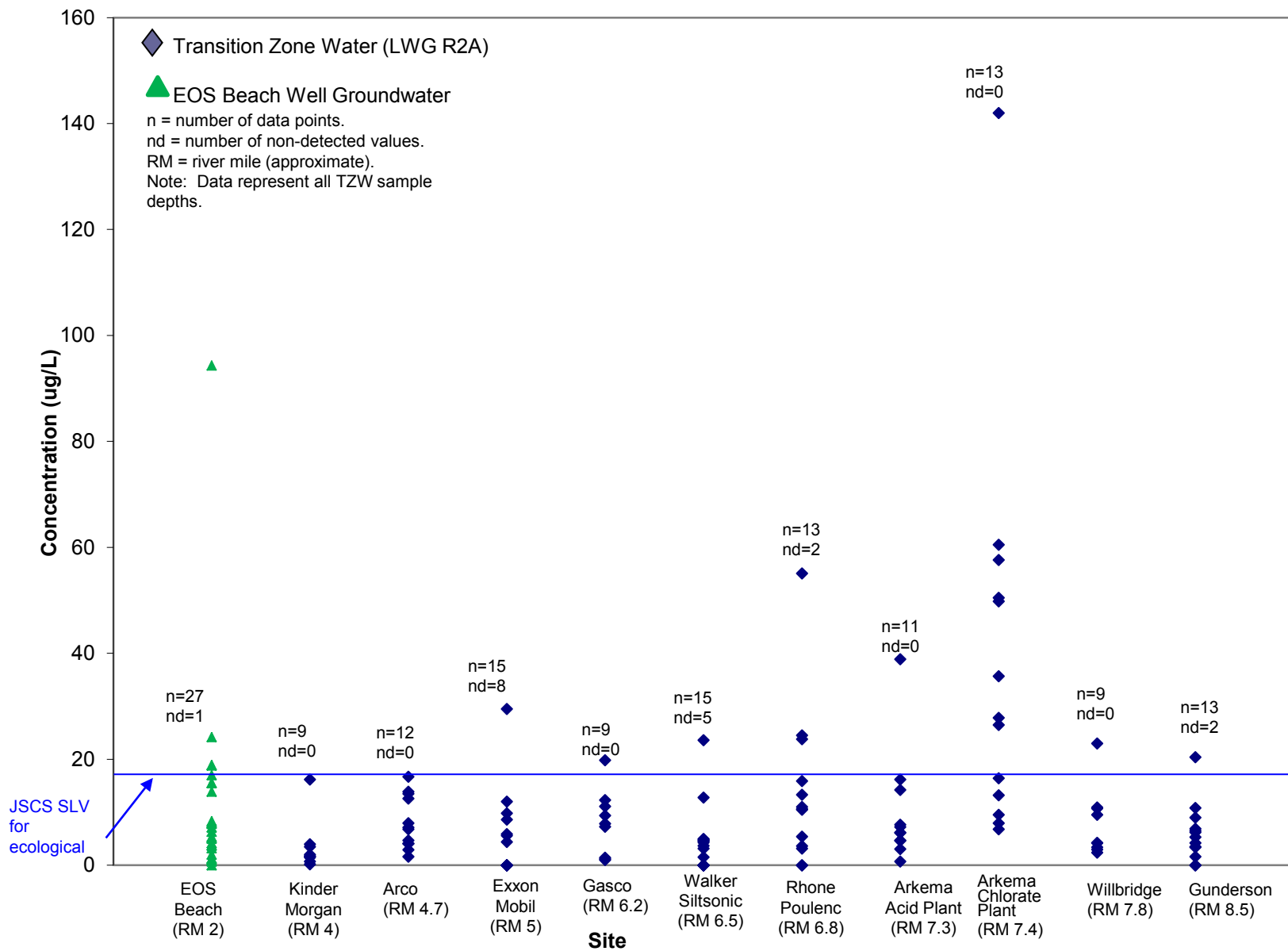


Figure E-5.
Total Nickel in LWG Transition Zone Water by Site